Wireless LAN Mobility System

Wireless LAN Switch Manager User's Guide

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About This Guide

This manual shows you how to plan, configure, deploy, and manage a Mobility System wireless LAN (WLAN) using the 3Com Wireless LAN Switch Manager (3WXM).

Read this manual if you are a network administrator or a person responsible for managing a WLAN.

If release notes are shipped with your product and the information there differs from the information in this guide, follow the instructions in the release notes.

Most user guides and release notes are available in Adobe Acrobat Reader Portable Document Format (PDF) or HTML on the 3Com World Wide Web site:

http://www.3com.com/

Conventions

Table 1 and Table 2 list conventions that are used throughout this guide.

Table 1 Notice Icons

Icon	Notice Type	Description
	Information note	Information that describes important features or instructions
	Caution	Information that alerts you to potential loss of data or potential damage to an application, system, or device

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This manual uses the following text and syntax conventions:

Table 2 Text Conventions

Convention	Description
Menu Name > Command	Indicates a menu item that you select. For example, **File > New** indicates that you select **New** from the File menu.
`Monospace text`	Sets off command syntax or sample commands and system responses.
Bold text	Highlights commands that you enter or items you select.
Italic text	Designates command variables that you replace with appropriate values, or highlights publication titles or words requiring special emphasis.
[ ] (square brackets)	Enclose optional parameters in command syntax.
{ } (curly brackets)	Enclose mandatory parameters in command syntax.
| (vertical bar)	Separates mutually exclusive options in command syntax.
Keyboard key names	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press Ctrl+Alt+Del
Words in *italics*	Italics are used to: ▪ Emphasize a point. ▪ Denote a new term at the place where it is defined in the text. ▪ Highlight an example string, such as a username or SSID.

Documentation

The 3WXM documentation set includes the following documents.

- *Wireless LAN Switch Manager (3WXM) Release Notes*

  These notes provide information about the system software release, including new features and bug fixes.

- *Wireless LAN Switch and Controller Release Notes*

  These notes provide information about the system software release, including new features and bug fixes.

- *Wireless LAN Switch and Controller Quick Start Guide*

  This guide provides instructions for performing basic setup of secure (802.1X) and guest (WebAAA™) access, for configuring a Mobility Domain for roaming, and for accessing a sample network plan in 3WXM for advanced configuration and management.

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- *Wireless LAN Switch Manager Reference Manual*

  This manual shows you how to plan, configure, deploy, and manage a Mobility System wireless LAN (WLAN) using the 3Com Wireless LAN Switch Manager (3WXM).

- *Wireless LAN Switch and Controller Installation and Basic Configuration Guide*

  This guide provides instructions and specifications for installing a WX wireless switch in a Mobility System WLAN, and basic instructions for deploying a secure IEEE 802.11 wireless service.

- *Wireless LAN Switch and Controller Configuration Guide*

  This guide provides instructions for configuring and managing the system through the Mobility System Software (MSS) CLI.

- *Wireless LAN Switch and Controller Command Reference*

  This reference provides syntax information for all MSS commands supported on WX switches.

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- *Document part number and revision (on the title page)*
- *Page number (if appropriate)*

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- *Part number 730-9502-0071, Revision B*
- *Page 25*

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1 GETTING STARTED

This chapter contains information about recommended system requirements you should meet for optimum 3WXM performance, installing 3WXM client and 3WXM Services software, and an introduction to using the 3WXM interface.

Hardware Requirements for 3WXM Client

Table 3 shows the minimum and recommended requirements to run the 3WXM client in Windows.

Table 3 Hardware Requirements for Running 3WXM Client in Windows

	Minimum	Recommended
Processor	Intel Pentium 4 2 GHz or equivalent	Intel Pentium 4 3 GHz or equivalent
RAM	512 MB	1 GB
Hard drive space available	100 MB	200 MB
Monitor resolution	1024x768 pixels, 24-bit color	1600x1200 pixels, 32-bit color
CD-ROM drive	CD-ROM or equivalent	CD-ROM

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Hardware Requirements for 3WXM Services

Table 4 shows the minimum and recommended requirements to run the 3WXM Services in Windows.

Table 4 Hardware Requirements for Running 3WXM Services in Windows

	Minimum	Recommended
Processor	Intel Pentium 4 2.4 GHz or equivalent	Intel Pentium 4 3.6 GHz or equivalent
RAM	1 GB	2 GB
Hard drive space available	1 GB	2 GB
Monitor resolution	1024x768 pixels, 24-bit color	1600x1200 pixels, 32-bit color
CD-ROM drive	CD-ROM or equivalent	CD-ROM

Software Requirements

3WXM client and 3WXM Services are each supported on the following operating systems:

- Microsoft Windows Server 2003
- Microsoft Windows XP with Service Pack 1 or higher
- Microsoft Windows 2000 with Service Pack 4

You must use the English version of the operating system you select. Operating system versions in other languages are not supported with 3WXM.

The following additional software is required for certain 3WXM features:

- HP OpenView Network Node Manager 6.4—Must be installed prior to 3WXM if you plan to use 3WXM in your HP OpenView environment.
- Adobe Acrobat Reader 5.*x* or later (or plug-in)—For reading the *Wireless LAN Switch Manager Reference Manual* and release notes.
- Web browser (for example, Microsoft Internet Explorer 5.*x* or 6.*x* or Netscape Navigator 6.*x* or 7.*x*)—For displaying 3WXM Help, work orders and inventory reports.

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Preparing for Installation

Before you install 3WXM, make sure you have the appropriate administrative privileges on the system and a license key if required. If you plan to install the HP OpenView plug-in for 3WXM, which allows you to integrate 3WXM into an HP OpenView environment, make sure that HP OpenView is already installed.

User Privileges

Before you install 3WXM, make sure that you are logged in as a user who has permission to install software, or as an administrator.

After you install 3WXM, you can configure 3WXM access privileges for the user accounts on the machine. Likewise, you can configure access privileges for 3WXM Services, if installed. Access privileges for the 3WXM client are completely independent of access privileges for 3WXM Services, and are configured separately.

Serial Number, License Key and Activation Key

The serial number is generated automatically when the 3WXM software is installed.

The license key is included with your 3WXM software packaging. You will need a separate license key for each host on which you plan to run 3WXM. The license supplied with 3WXM allows you to manage up to 10 wireless switches. If you plan to manage more wireless switches, you will also need an Unlimited Device license key (3CWXMUPA). You will need a separate Unlimited Device license key for each host on which you plan to run 3WXM to manage more than 10 devices.

If you do not have a license key, you can run 3WXM for 30 days. Once this trial period is over you will need to purchase a license to continue running the 3WXM software.

When you initially run the 3WXM software, it will ask if it is to be run as a trial or as a fully licensed version. In the latter case, it will then ask for the license key. The software will then display the serial number and ask for an activation key.

To obtain an activation key, you must register the product with 3Com. If you press the *Get Activation Key* button, your web browser will be automatically launched at the correct pages for registering the product. Once registration is complete, your activation key will then be displayed and e-mailed to you.

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Once the activation key has been accepted, you may enter an Unlimited Device license key. This will require its own activation key, which can be obtained in the same manner.

If you are registering your product using the web browser on a different host, and you wish to register for the 30-day trial, then you will need to select 3CWXMA as the software that you are registering. If you have a license key, then you should select 3CWXM10A. This will register both the software and the license. The Unlimited Device license is registered as 3CWXMUPA.

HP OpenView Network Node Manager

If you want to integrate 3WXM into your HP OpenView environment, you have the option of installing the HP OpenView plug-in required to use Network Node Manager with 3Com products. Make sure that HP OpenView is already installed before installing 3WXM with the plug-in.

Resource Allocation

Table 5 contains general recommended guidelines for hardware requirements and memory allocation based on the number of radios and WX switches your server will support. A larger number of WX switches implies more connections and data processing, and consequently, more CPU is required. A larger number of radios implies more data (including client sessions) which requires more RAM and storage.

Table 5 Recommended Server Hardware Allocation

Number of Radios	1-25 WX Switches	25-50 WX Switches	50+ WX Switches
1 – 1000	- 2.4 MHz P4	- 2.8 MHz P4	- 3.2 MHz Xeon
	- 500 MB RAM	- 500 MB RAM	- 1 GB RAM
	- 1 GB HD	- 1 GB HD	- 1 GB HD
1000 – 2000	- 2.4 MHz P4	- 3.0 GHz P4	- 3.6 GHz Xeon
	- 1 GB RAM	- 1 GB RAM	- 2 GB RAM
	- 2 GB HD	- 2 GB HD	- 2 GB HD

3WXM Services Options

3WXM Services can be installed either in standalone mode or shared mode. Standalone mode is when 3WXM client and 3WXM Services are installed on one machine. Standalone mode is primarily used for trying out 3WXM, while shared mode is used in a working environment. In shared mode, the administrator sets up 3WXM Services on a single host (typically with more resources) and other hosts with the client 3WXM

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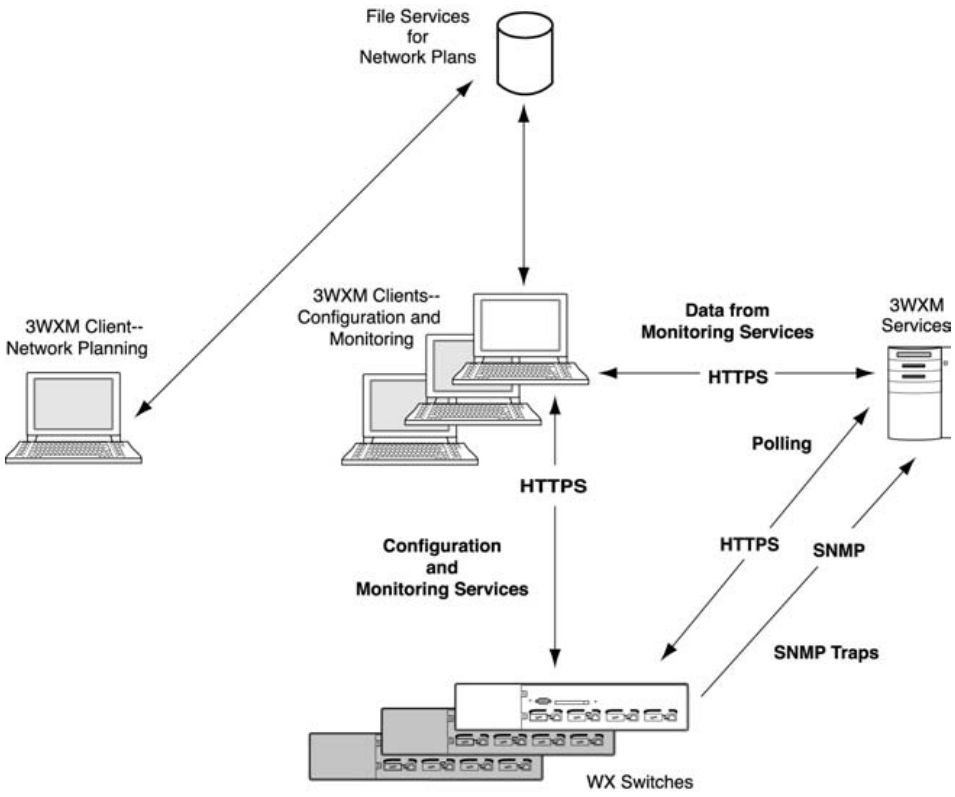
application share 3WXM Services to access network plans and monitoring information. See Figure 1.

Figure 1 3WXM Services in Shared Mode



During the 3WXM installation, you can select to install the 3WXM Services and 3WXM client, or the client only. If you select the option that installs 3WXM Services, the services are installed with default settings that are adequate for getting started.

Network plans are stored on the server. By default, only local access is allowed. Remote clients cannot access the server unless you enable remote access.

To learn more about RF monitoring and client monitoring, see "Managing and Monitoring Your Network" on page 143.

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Installing 3WXM

The same 3WXM install program installs either just the 3WXM client or both the 3WXM client and 3WXM Services.

This section contains information about the following topics:

- "Unpacking Files" on page 18
- "Using the Installation Wizard" on page 18

Unpacking Files

To unpack files on Windows systems:

1. Insert the 3WXM CD in the CD-ROM drive. If Autorun is enabled, wait briefly for the install program to start. For more information about using the installation wizard, see "Using the Installation Wizard" below.

   If Autorun is disabled, follow these steps:

   a. In Windows Explorer, navigate to your CD-ROM drive.

   b. In the Windows\VM directory, double-click **install.exe**.

      The Introduction page of the 3WXM installation wizard appears.

2. Click **Next** to display the Choose Installation Type page of the installation wizard, and go to "Using the Installation Wizard".

Using the Installation Wizard

To use the Installation Wizard:

1. On the Choose Installation Type page, choose one of the following:
   - To install both the 3WXM server and the client, click the 3WXM Services icon.
   - To install only the 3WXM client, click the 3WXM client icon.

For detailed installation instructions, see "Installing 3WXM" in the Wireless LAN Switch Manager Reference Manual.

Start the 3WXM Services

The 3WXM Services are automatically started when you install it on a Windows system.

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Connect 3WXM Clients to 3WXM Services

To connect the client to Services:

1. Select **Start > Programs > 3Com > 3WXM > 3WXM**. The 3WXM Services Connection wizard is displayed.
2. Enter the IP address or fully-qualified hostname of the machine on which the service is installed.

   If 3WXM Services is installed on the same machine as the one you are using to run 3WXM client, enter 127.0.0.1 as the IP address. This is a standard IP loopback address.
3. Specify the service port, if different from the port number in the Service Port listbox.

The port number used by the monitoring service must not be used by another application on the machine where the monitoring service is installed. If the port number is used by another application, change the port number on the monitoring service. (See "Configure 3WXM Services" below.)

4. Click **Next** to connect to the server.
5. If the Certificate Check dialog is displayed, click **Accept.**

   If you left the Open Network Plan option on the 3WXM Services Connection dialog selected, the server opens a new (blank) network plan.

Configure 3WXM Services

You can change the properties of 3WXM Services.

If a firewall is enabled on the host where you install 3WXM Services, 3WXM Services will not be able to communicate with 3WXM client or with WX switches unless the firewall is configured to allow through traffic for the SSL and SNMP ports (443 and 162 by default).

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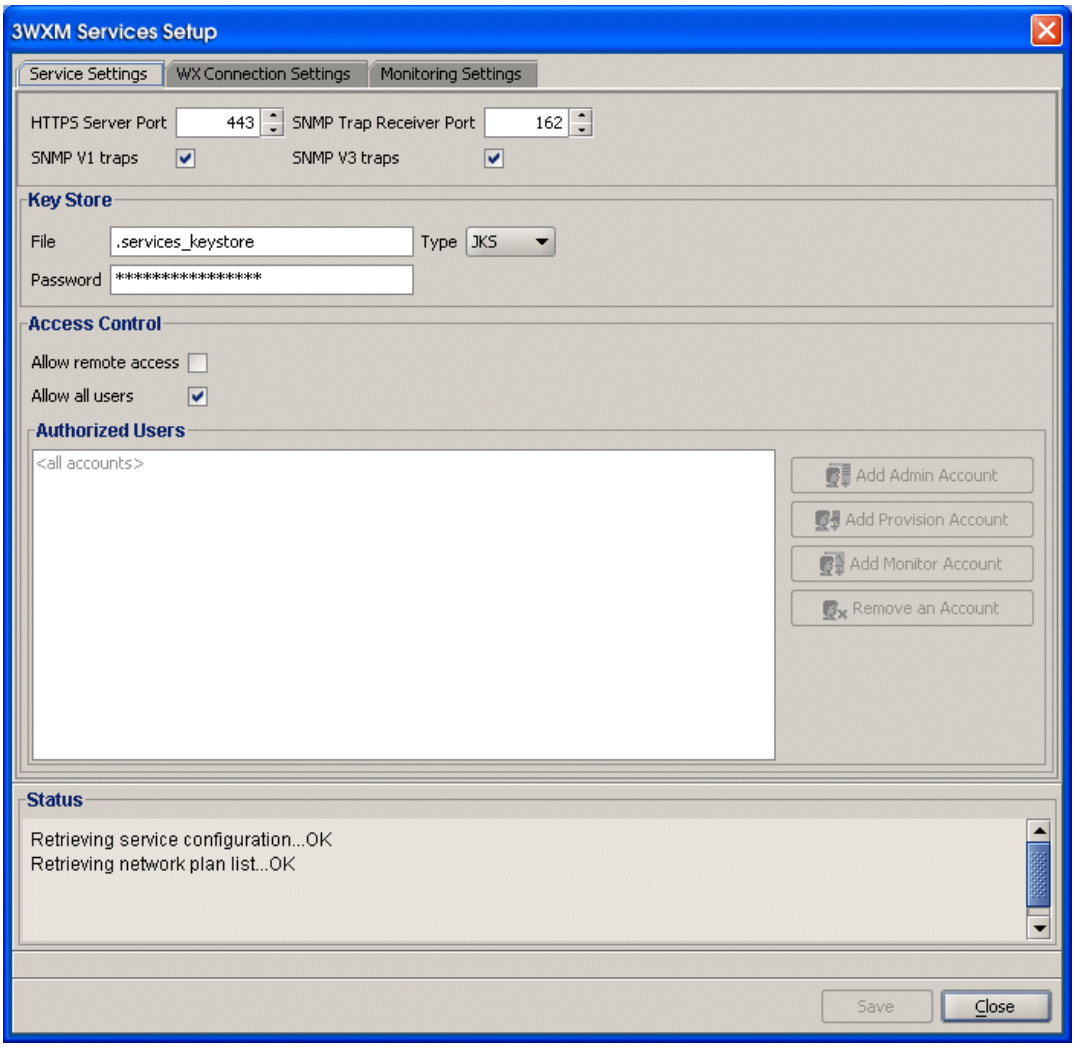
To configure 3WXM Services:

1 Select **Tools** > **3WXM Services Setup** dialog box from the 3WXM main tool bar. The 3WXM Services Setup wizard is displayed.



2 You can optionally configure the following:

- Select the arrow buttons to change the HTTPS Server Port, which is the port on which 3WXM Services listens for requests from 3WXM client.
- Select the arrow buttons to change the SNMP Trap Receiver Port, which is the port on which SNMP traps are received. Also select the trap type (SNMPv1 or SNMPv3) you want 3WXM Services to receive from WX switches.

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On each switch in the network plan, you must enable notifications and configure 3WXM Services as a notification target (trap receiver).

3WXM Services does not start listening for SNMP notifications from switches until you save the network plan.

- From the Key Store area of the window, specify security settings.
- From the Access Control area, define user accounts. For more information about access control, see "3WXM Access Control" on page 21.

By default, a username and password are not required to access 3WXM Services from 3WXM client, but only local connections (connections from client to server on the same host) are allowed. To change these settings, use the Service Settings tab of the 3WXM Services Setup dialog.

To select monitoring settings:

All monitoring options are enabled by default. You do not need to enable them and you do not need to specify the switches you want to monitor. However, for 3WXM Services to receive trap data from WX switches, SNMP notifications must be enabled on the switches. (See "Deploy Your Configuration" on page 144.)

To start gathering data for monitoring, deploy your configuration to the network. For information about deploying your configuration, see "Deploy Your Configuration" on page 144.

3WXM Access Control

You can create a user account with administrator, provision, or monitor privileges. See Table 6 for privilege definitions.

Table 6 User Privilege Levels

Privilege Level	Access Control	Configuration	Monitoring
Administrator	yes	yes	yes
Provision	no	yes	yes
Monitor	no	no	yes

To configure access control:

1. Select **Tools** > **3WXM Services Setup** from the 3WXM main tool bar. The 3WXM Services Setup window is displayed.
2. In the Access Control area of the window, deselect **Allow all users**.

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3 Select **Add Admin Account, Add Provision Account**, or **Add Monitor Account**. A dialog box is displayed.

4 Enter the account name and the password and click **OK**.

5 To remove an account, click **Remove Account**.

3WXM Interface

This section contains the following topics:

- "Display the Main Window" on page 22
- "Using Menu Bar and Toolbars" on page 24
- "Setting Preferences" on page 24
- "Easy Configuration Using Wizards" on page 25
- "View Topology" on page 25
- "Shortcut to Wizards and Editing Properties" on page 26
- "Shortcut to Wizards and Editing Properties" on page 26
- "Getting Help" on page 27

Display the Main Window

When you open a network plan or create a network plan using the Network Planning wizard, 3WXM displays the Main window. The Main window is divided into four panels (see Figure 2 on page 23):

1 *Organizer* panel displays a network tree representing your WLAN's devices and configurations on those devices. You can use it to navigate to Policy configurations, Equipment within your network, and network Sites.

When you select a device or configuration in the tree, the context-sensitive information about the device or configuration is displayed to the right in the Content and Information panels. Select the Details checkbox at the top of the Organizer panel to display detailed configuration information about items in the tree.

2 *Content* panel displays context-sensitive information about the device or configuration selected from the tree in the Organizer panel. From the Content panel, view 3Com devices and their status, verify 3Com device configurations in the network plan and in the network, and display event logs and Rogue detection results.

3 *Alerts* panel displays a summary of alerts, including network and configuration verification, Rogue detection, and local and network changes. Click on a summary to display details.

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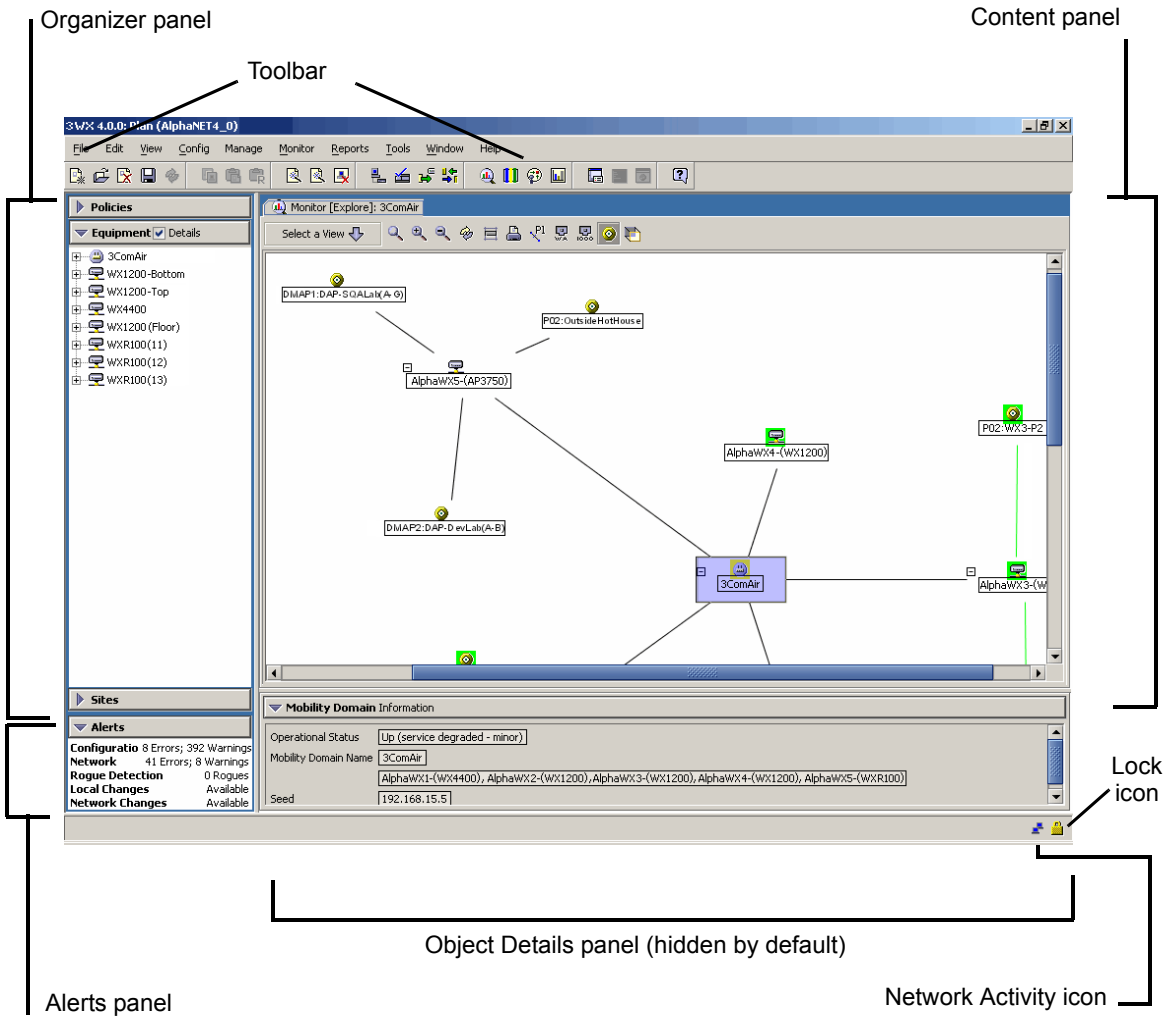
4 *Information* panel displays information about an object you select from the navigation tree under the Organizer panel. The information is dependent upon the object selected.

The Network Activity icon displays statistics for management traffic between 3WXM and the WX switches in the network plan. You can click on the icon to display more details.

The Lock icon indicates whether the network plan has been locked. When you make changes to a network plan, 3WXM locks it on the server. The lock prevents other clients who open the network plan from modifying it while you are making changes. The network plan remains locked until you save your changes, after which the lock is released.

Figure 2 3WXM Main Window



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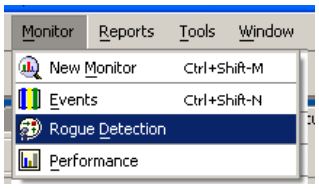
Using Menu Bar and Toolbars

The Main window and individual panels have a menu bar at the top to select certain actions. Select an item from the menu bar, then select an action from the dropdown menu. See Figure 3.

Figure 3 Menu Bar with Dropdown Menu



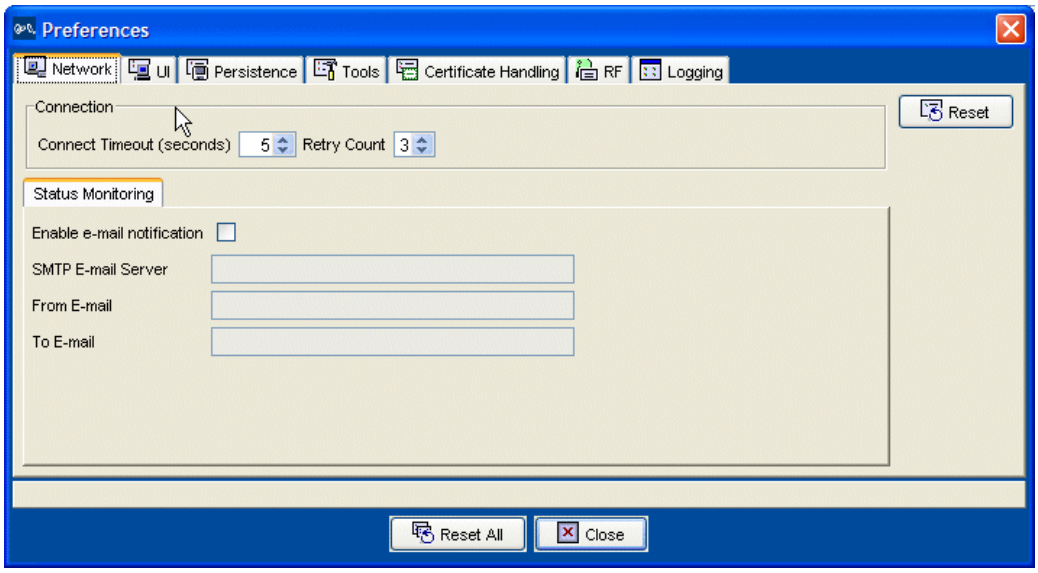
Setting Preferences

You can set network and user interface preferences, as well as preferences for save interval and autosave, certificate handling, RF monitoring, and logging.

1 Select **Tools** > **Preferences** from the 3WXM main tool bar.

The Preferences wizard is displayed.

Figure 4 Preferences Wizard



2 Select any of the tabs, make modifications in the fields, and select **Reset All** to reset preferences.

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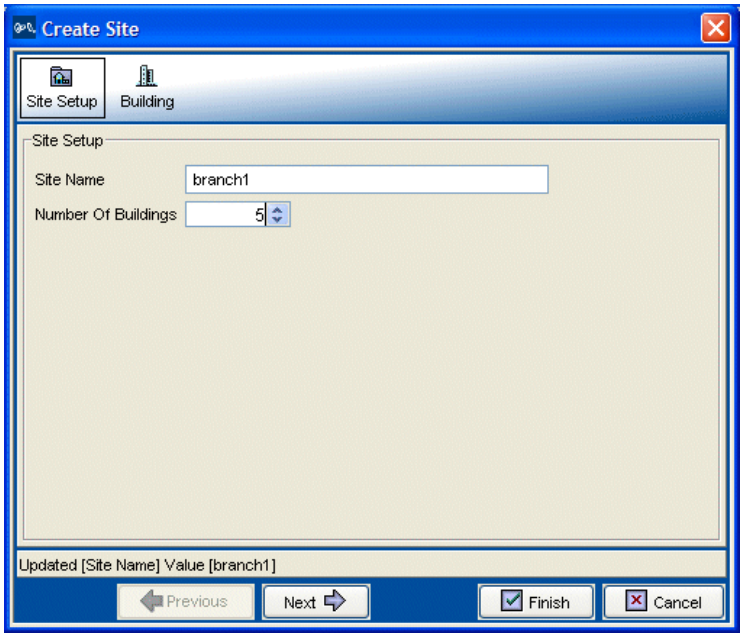
Easy Configuration Using Wizards

Wizards help walk administrators through configuration steps. There are several wizards in the 3WXM application.



Enter the required fields and click **Next** at the bottom of the wizard to display the next step. Click **Cancel** to discard any changes made with the wizard. When you are done, click **Finish** to save changes.

You can right-click on many objects to display the **Insert** option. Select **Insert** to create a new object that is a "child" of the selected object.

View Topology

You can display a topology view of managed devices in your WLAN and their relationships to each other. You can also click on the devices in the topology view to display summary monitoring information about each one.

To display a topology view of your network:

1. In the Equipment section of the Organizer panel, select a mobility domain or a WX switch.
2. From the main 3WXM window, select **Monitor > New Monitor**.
3. Select **Explore** from the drop-down list in the Monitor tab. The topology view of the selected object is displayed.

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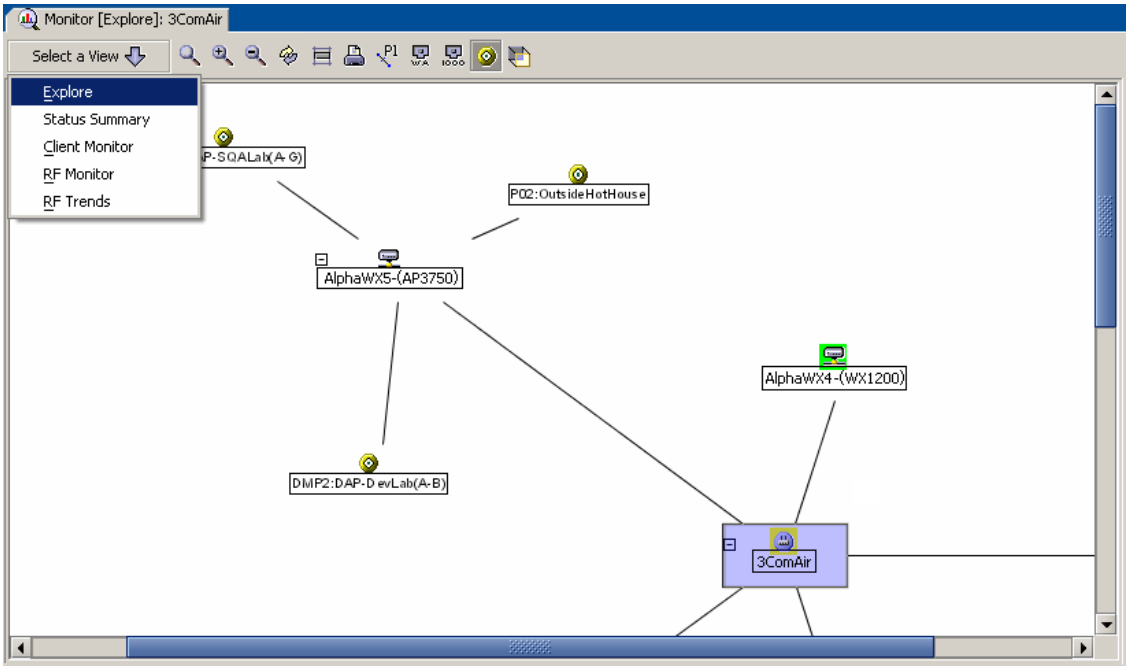

Shortcut to Wizards and Editing Properties

Shortcuts are built into the 3WXM interface to quickly access wizards and for editing properties for selected objects.

To use shortcuts:

1. Right-click an object from the topology tree in the Organizer panel.
2. Select one of the options displayed. You can select **Edit** to edit object properties, or **Insert** to display a wizard that assists you to create a new object.

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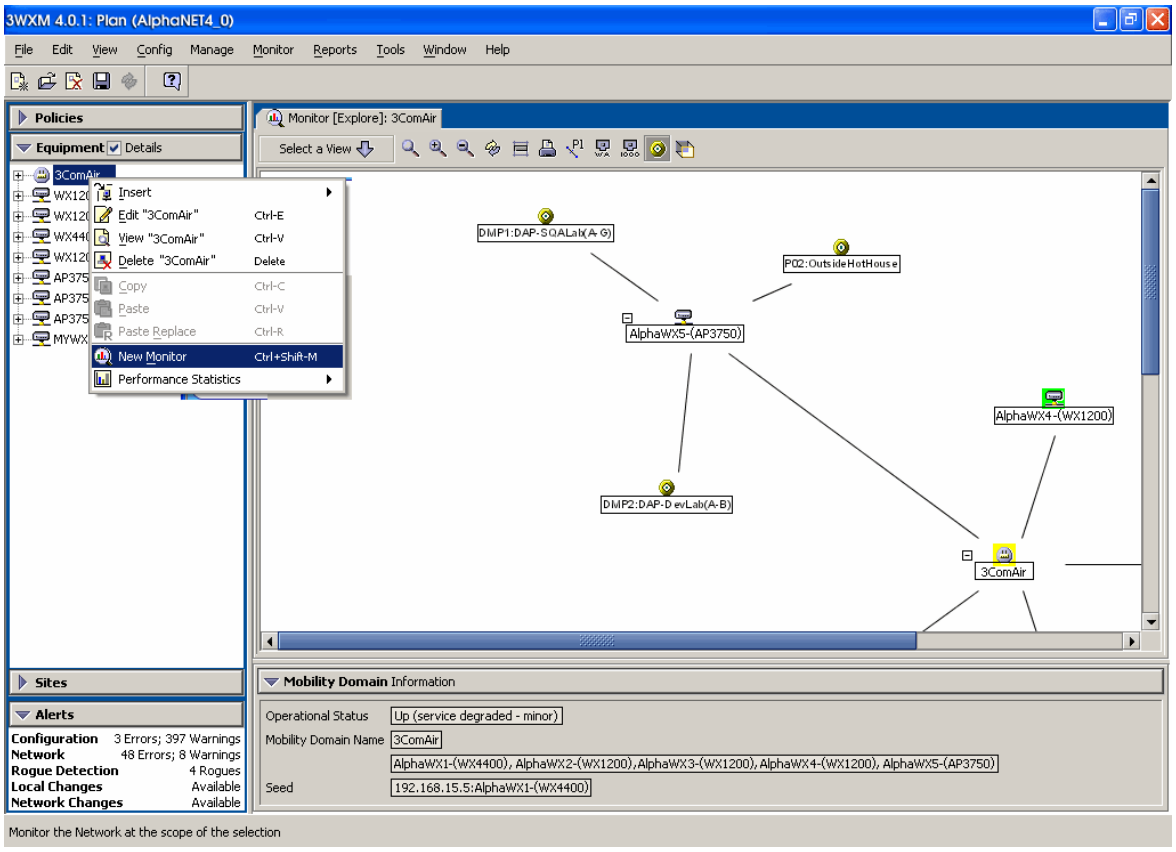

Getting Help Click **Help** from the Main menu bar to access different types of help:

1. Select **Help** > **3WXM Help** to display HTML help about configuring and using 3WXM.
2. Select **Help** > **Licensing** to view product licensing information, or to add an Unlimited Device license to the installation.
3. Select **Help** > **Report Problem** to report a problem to 3Com Technical Support.
4. Select **Help** > **About 3WXM** to display information about 3WXM and to display the Release Notes. You also can click **Force GC** (garbage collection) to free resources.

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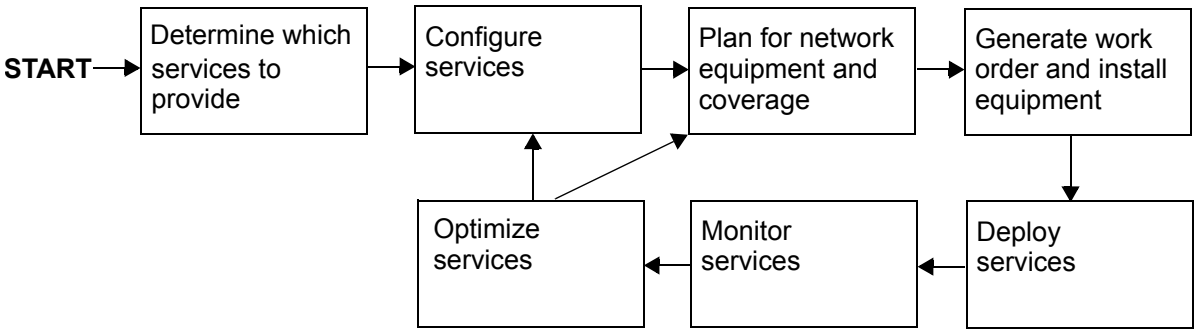
2 Planning and Managing Your Wireless Network with 3WXM

This chapter contains information about planning and managing your wireless network with 3WXM. Planning your wireless network is highly recommended because it not only helps you configure and deploy it, but also aids in scaling and monitoring your network. 3Com provides you with flexible tools to assist with network planning.

Overview

You plan your wireless network to support the services you want to offer your employees, guests, or customers. Figure 5 describes the process you will follow to establish services in your company or organization, beginning with determining the services you want to offer. Each step in the process is described in this chapter.

Figure 5 Process to Establish Wireless Services



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Which Services To Provide?

A service is a concept (not a selectable item in the 3WXM interface) that represents a set of options you configure and deploy on your wireless network.

You configure services to support the different levels of network access you need to provide. For example, a service configured to support employee access will have different options configured to provide greater access to the network. In contrast, a service configured for guest access typically restricts users to limited or no internal network access, but easily provides a gateway connection to the Internet.

A service can be fully isolated and independent of other services on the network (multi-hosted access is typically isolated), or you can reuse part of a service configuration for another service you want to provide. Each service has potential authentications (802.1X, web page, MAC address, or "last resort") and potential encryptions (802.11i, WPA, WEP, or unencrypted).

The purpose of this section is to provide information about services that you can configure using 3WXM. Understanding the services you can configure with 3WXM is the first step in planning and configuring your network.

The first step you need to do when planning your wireless network is to determine which services your organization requires. The three common types of services are:

- Employee access
- Guest access
- Voice over Wireless IP (VoWIP)

Employee access is typically secure, encrypted access to the wireless network. Guest access is access (possibly unencrypted) for visitors at your location. If you intend to resell services to other providers, you will need to provide multi-hosted access.

Determining the services you will need at the beginning of the planning process results in configuration data. The configuration data is used to create service profiles and AAA rules for each service. A *service profile* is a subset of a radio profile. A *radio profile* is a common set of configuration parameters that can be applied to many MAP radios.

See "Create a Service Profile" on page 94 for information about configuring services.

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Network Plan

A network plan is the workspace in 3WXM you use to design a wireless network.

You can better manage and visualize your network topology by creating a detailed and accurate network plan.

You can start by creating a device-oriented (WX switches and MAPs) view of your network without any geographic information about your site—no floor dimensions, building material information, or RF obstacle information. You can go a step further and provide some geographic information by adding floor dimensions, your RF coverage area, and some attenuation information, such as elevator shafts or internal concrete walls. If you want to enjoy the full benefits of network monitoring and visualization, you can create a detailed network plan. This is done by importing detailed building and floor plans into 3WXM, defining RF obstacles, and defining the quality of coverage (traffic engineering parameters) you want for specific RF coverage areas.

RF Coverage Area

An RF coverage area is the geographical area in which IEEE 802.11 radios provide wireless services.

This section describes the three techniques you can use for RF coverage. By understanding available RF coverage planning techniques, you can use the technique that meets your organization's requirements.

There are three techniques you can use to get your wireless network started:

- **RF Auto-Tuning** lets you use the default auto tuning feature to select power and channel settings for RF signals in your RF coverage area. You upload the WX switches into 3WXM, configure the MAPs, enable RF Auto-Tuning, and deploy.

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- **RF Auto-Tuning with Modelling**, as with the RF Auto-Tuning technique, lets you set the auto tuning feature to adjust power and channel settings to provide RF signals to the coverage area for your users. Enhance the auto tuning feature by providing modelling information about your geographic location. By providing some information about your buildings and floors, you add enough details into 3WXM so that your can better visualize your network topology and support improved monitoring at your site.
- **RF Planning** is a technique you can use to create a detailed network plan that provides powerful monitoring and visualization benefits. Unlike RF Auto-Tuning or RF Auto-Tuning with Modelling, you do not rely on the auto tuning feature. Instead, you fully model your geographic location with detailed information about your floors, and specify your RF coverage areas and your RF obstacles.

Each of these methods is described in the sections that follow.

RF Auto-Tuning

To use the RF Auto-Tuning technique:

- Physically place WX switches and the MAPs in their desired locations.
- Upload a WX switch configuration and deploy it
- Enable the RF Auto-Tuning feature

This is a great way to install a WX switch and some MAPs, and observe how the network operates. The RF Auto-Tuning plan is best suited to networks containing fewer MAPs.

RF Auto-Tuning with Modelling

To use the RF Auto-Tuning with Modelling technique, you add to the RF Auto-Tuning technique by providing some geographical modelling about your building, floors, and RF coverage area. You also add RF obstacle information for major obstacles (like concrete walls, windows, and elevator shafts) that affect attenuation—the quality of RF signals emitted from and received by the MAPs.

By adding geographical modelling, you will be able to manage your network in the context of that geographical information. For example, you will be able to manage your network overlaid on a floor plan, versus managing an abstract logical group of switches and MAPs.

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RF Planning

To do RF Planning, you provide detailed information about your site and buildings by importing AutoCAD DXF™, AutoCAD DWG, JPEG, or GIF floor plan files of the buildings into 3WXM.

As you import the floor plans, you can modify them to add or remove RF obstacles. 3WXM includes a library of attenuators for building obstacles. The library includes doors, walls, ceilings, and other physical obstructions that you can select. Attenuators can be defined by height, width, type of building material. 3WXM factors in the impact these objects have on how the radio frequency (RF) signals flow through a given site.

If the network contains third-party APs, you can enter information for these APs so that 3WXM takes the APs into account when calculating the placement (and optionally, the channel and power settings) of the 3Com MAPs.

By using this technique, you receive these substantial benefits:

- Instead of you making a "best guess" as to how many MAPs you require for the desired coverage and where MAPs should be placed, 3WXM automatically calculates how many MAPs you need and where to place MAPs for optimal positioning.
- You can generate a deployable work order to help installers place WX switches and MAPs.
- You automatically receive a deployable configuration that includes optimum power and channel settings.
- You enjoy more accurate monitoring options and network visualization based on the additional geographic modelling information loaded into 3WXM.

Which Planning Method Should I Use?

The more detailed your network plan, the better you will be able to manage and monitor the network. However, there are other requirements organizations should consider.

3Com suggests you use the **RF Auto-Tuning** technique if you are installing MAPs without consideration to blanket coverage, throughput concerns, or the number of users for whom service will be provided. RF Auto-Tuning is ideal for small areas; for example, coverage that only requires a few MAPs, or widely dispersed areas in a building, such as conference rooms.

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Use the **RF Auto-Tuning with Modelling** technique if you want to better monitor your wireless network in terms of buildings, floors, or coverage areas. You may only be able to locate inaccurate or incomplete building and floor plans (perhaps only a JPEG file), but with even a bit more geographic modelling of your site, you boost your ability to manage and visualize your network.

Use **RF Planning** when you want to use all the tools provided in 3WXM to deploy, manage, and monitor your network. You likely have multiple constituencies of users you need to consider; for example, sets of users that are mobile and wireless that have specific throughput and bandwidth needs. One group of users may be mobile and require high throughput performance (a higher bandwidth), while another group of users are more stationary and require less throughput. Additionally, you may be planning for future capacity, and need to add as much detailed information as you can about your site in order to plan for the future.

See Table 7 for some guidelines to help you determine what planning technique is right for your organization.

Table 7 Planning Techniques to Use

Concern	If yes, use	If No, use
Do I have adequate time to add geographic modelling and RF obstacle information?	RF Auto-Tuning with Modelling	RF Auto-Tuning
Can I locate accurate building and floor plans?	RF Planning or RF Auto-Tuning with Modelling	RF Auto-Tuning with Modelling
Do I need to plan for capacity of users or quality of coverage (traffic engineering concerns) for certain users?	RF Planning	RF Auto-Tuning or RF Auto-Tuning with Modelling
Do I need to visualize coverage accurately?	RF Planning	RF Auto-Tuning or RF Auto-Tuning with Modelling
Do I need to locate users?	RF Planning or RF Auto-Tuning with Modelling	RF Auto-Tuning

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Table 7 Planning Techniques to Use

Concern	If yes, use	If No, use
Do I need to locate rogue APs?	RF Planning or RF Auto-Tuning with Modelling	RF Auto-Tuning
Do I want to better monitor my wireless network in terms of buildings, floors, or coverage areas?	RF Planning or RF Auto-Tuning with Modelling	RF Auto-Tuning

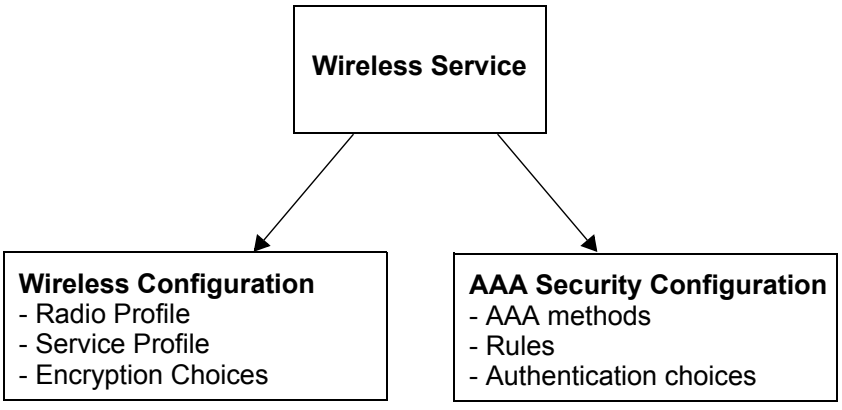
If RF Planning does not fit your requirements now, you can always use the RF Planning technique in the future when you have the need, the time, and the necessary floor plans available. You also can leverage the data in RF Auto-Tuning and convert these RF measurements to configured baseline values for planning.

Configuration

This section describes the main areas of the 3Com network (WX switch and MAPs) you will configure in 3WXM. It provides you with overview information about the software so that you can plan a configuration to support the services you require.

You will configure the wireless configuration and AAA security configuration for each service you provide on your wireless network. You also create a basic configuration for the WX switch.

Figure 6 Configuration Required for Each Service



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This section contains information about:

- "Wireless Configuration" on page 36
- "AAA Security Configuration" on page 38
- "System and Administration Configuration" on page 40

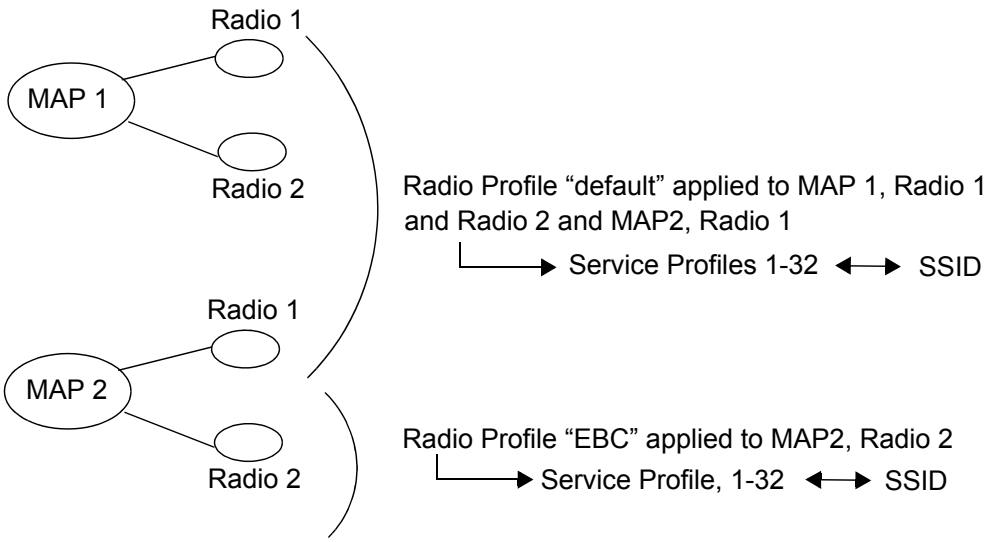
Wireless Configuration

Wireless configuration focuses on the configuration tasks (radio configuration and AAA configuration) you do to deliver the virtual wireless services you want to provide on your network. You enable the MAPs to operate according to your planned RF coverage requirements. Most of the wireless configuration is done as you plan your RF coverage and create your radio profiles and service profiles.

A radio profile is used to apply common settings to multiple radios, and each radio profile can support up to 32 service profiles, one for each service you want to support. You specify in the service profile an SSID for each service and the type of encryption mechanisms to be used by the MAP radios. This gives the radio the potential to look like 32 different and independent MAPs. See Figure 7.

AP7250, AP8250, and AP8750 support up to eight service profiles per radio. AP2750 and AP3750 support up to 32 service profiles per radio.

Figure 7 Radio and Service Profiles



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You must configure a radio profile to set attributes that you can apply to multiple radios. Rather than configuring each radio individually, you create a radio profile and apply it to multiple radios that you select. You can also create a radio profile as part of a domain policy and apply it to MAP access points on different WX switches.

The radio profile can contain RF Auto-Tuning settings and IEEE 802.11 settings that control how the data is received and transmitted. You can select RF Auto-Tuning in the radio profile to apply AutoRF settings (enable or disable auto tuning of power and channels) to radios en masse via the radio profile. AutoRF enabled through the radio profile to multiple radios can be easily disabled, too, should you want to go to full RF planning. You can set specific IEEE 802.11 settings, such as beacon, DTIM intervals, and the fragment threshold to control how packets are transmitted.

A default radio profile named "default" is provided and cannot be deleted.

For each service you want to provide, you configure the following items in a service profile:

- The SSID name
- SSID advertisement (whether the SSID name is beaconed)
- Whether the SSID name is encrypted or clear (not encrypted)
- Web page (if using WebAAA)
- Multiple encryption choices (Dynamic/static WEP, WPA, WEP + WPA, 802.11i)

You also must configure AAA security configuration items for each service. For more information, see "AAA Security Configuration" on page 38.

Which encryption you use depends on the type of services you're offering. Employee access is typically encrypted, guest access is typically *clear* (no encryption), and *multi-host* or "multiple virtualized services" service can be encrypted, with each SSID being matched with its own service profile.

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If services are being used for customer corporate entities (e.g. different airlines on an airport wireless net), then they would probably use 802.1X and strong encryption with web guest access for their airport club guests. If the services are being used to advertise multiple wireless service providers (WISP), such as T-Mobile™, Wayport ®, and Boingo Wireless™, then these services would probably be completely open. However, they would likely be assigned to their own dedicated subnet containing their proxy server/billing gateway.

AAA Security Configuration

An administrator can control the way in which users access the network. For each service you provide, you can configure unique authentication, authorization, and accounting (AAA) security features, creating an entirely virtualized wireless service. For each service, you configure:

- Multiple authentication choices (802.1X, Web, AAA, MAC authentication, Bonded Auth, open)
- AAA methods (up to four RADIUS server groups, or a local database on the WX switch)

Authentication

Authentication is the method of determining whether a user is allowed access to your network. Users can be authenticated by a RADIUS server (pass-through) or by the WX switch local database (local). The WX switch can also assist the RADIUS server by performing the Extensible Authentication Protocol (EAP) processing for the server (offload).

To authenticate users, you will need to configure users either in the local database or on RADIUS servers. Each user will have a username, password, and RADIUS and/or vendor-specific attributes (VSAs). You will also need to configure authentication rules (802.1X, MAC, last-resort, or web authentication).

See Figure 8 on page 39 to see a flowchart representing the authentication process. Generally, 802.1X authentication is attempted first. If the user fails, then MAC authentication is attempted. If this fails, then last resort and web authentication is used. For a service profile, you specify *either* web authentication, last-resort, or none in the auth-fall-thru box. You can only select one.

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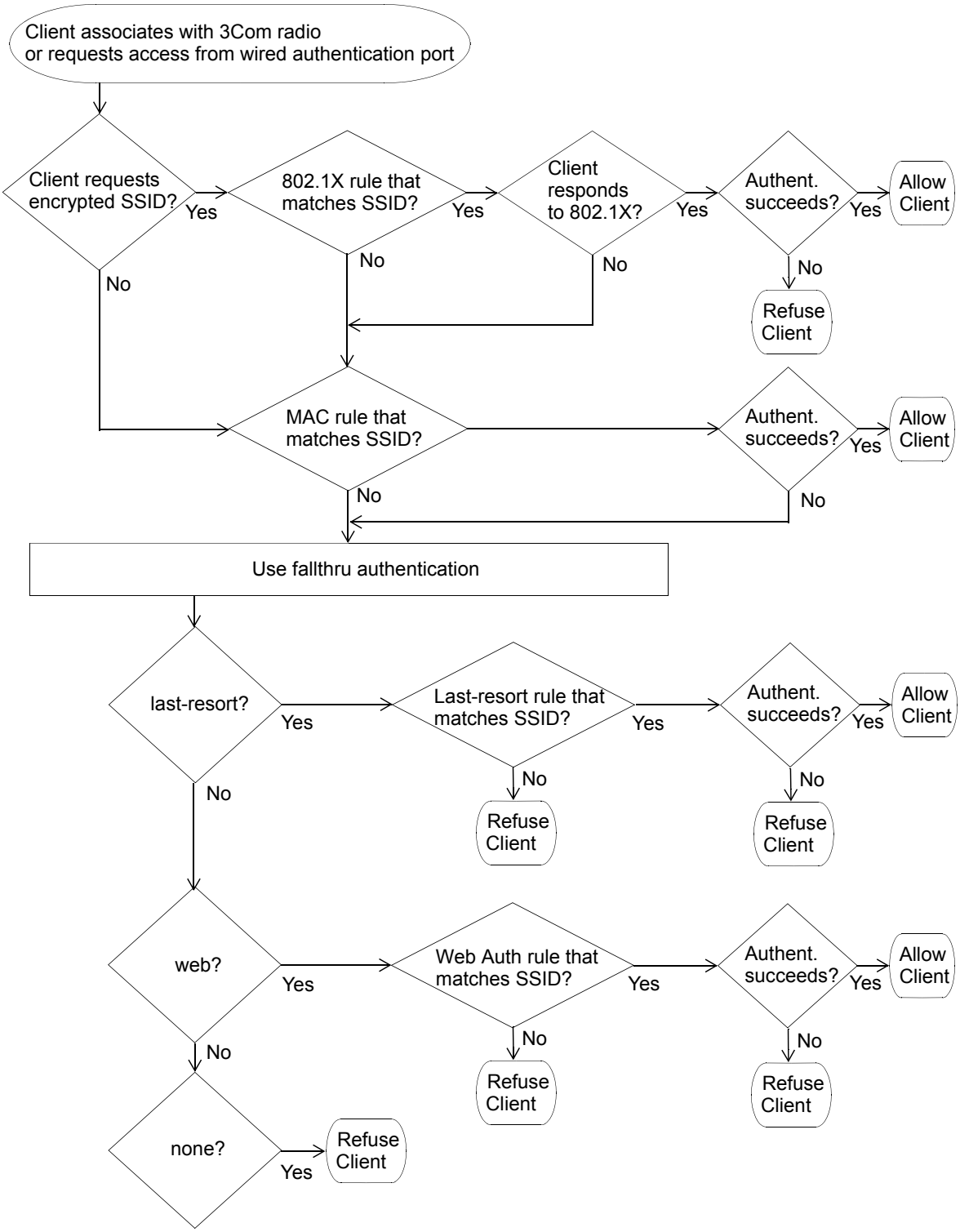
Figure 8 Authentication Flowchart for Network Users



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Authorization

Authorization is the method for providing users with specific rights to the network by associating attribute-value (AV) pairs to the user. AAA authorization works by assembling a set of attributes that describe what the user is authorized to perform. These attributes are compared to the information contained in a local database or on a RADIUS server for a given user and the result is returned to the WX switch to determine the user's actual capabilities and restrictions.

You can configure attributes, such as the time of day or specific VLAN access. You can also control access using security access control lists (ACLs), Mobility Profiles™, and Location Policies. Security ACLs permit or deny traffic based on IP protocol, IP addresses and, optionally, TCP or UDP port. They also can be used to set type-of-service (ToS) and class-of-service (CoS) values in a packet. Mobility Profiles contain attributes to allow or deny access to specific parts of the network for a specific user or group of users. Location Policies are an ordered list of location policy rules based on a user glob, VLAN, and/or ports. A Location Policy can be configured if you need to override the configured AAA user authorization attributes locally for a specific WX.

Accounting

Accounting collects and sends information used for billing, auditing, and reporting—for example, user identities, connection start and stop times, the number of packets received and sent, and the number of bytes transferred. You can track sessions through accounting information stored locally or on a remote RADIUS server. As network users roam throughout the network, accounting records track them and their network usage.

System and Administration Configuration

A Mobility Domain is a collection of WX switches that work together to support roaming users. One of the WX switches is defined as a *seed device*, which distributes information to the other WX switches defined in the Mobility Domain.

A Mobility Domain allows users to roam geographically from one WX switch to another without losing network connectivity. Users connect as a member of a VLAN through their authorized identities.

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Using the default Mobility Domain or one you create, add a WX switch to the network plan that is a member or seed device of the Mobility Domain. You can then configure that WX, or you can just add it to the network plan, and configure it later. After you configure the WX switch and verify its configuration, you can deploy it to the network.

You can create the following types of WX switches:

- WX4400—Provides four dual-interface gigabit Ethernet ports. Each port has a 1000BASE-TX copper interface and a Gigabit interface converter (GBIC) slot for insertion of a 1000BASE-SX or 1000BASE-LX fiber-optic interface.
- WX1200—Provides eight 10/100 Ethernet ports, six of which support PoE.
- WXR100—Provides two 10/100 Ethernet ports, one of which supports PoE.

You perform the following tasks to create and initially configure a WX switch:

- Configure basic WX switch properties.
- Configure WX switch connection information.
- Configure boot information.

Configure Basic WX Switch Properties

To configure basic WX switch properties, you specify a name, select a model, select its location by wiring closet, and select the Mobility System Software (MSS) you want to run on the switch. Optionally, you can select an MSS image to download when you deploy changes to the WX.

You also can specify if the switch is managed. A WX switch that is physically installed as well as configured can be managed. You can deploy configuration changes only to managed devices, and 3WXM periodically checks the managed WX switches in the network for changes. You also can fully configure a switch without it being physically installed (unmanaged). Having an unmanaged device in your network plan may be useful for predeployment purposes.

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Basic configuration also includes specifying how you will manage the switch. You can manage it through HTTPS, telnet, and Secure Shell (SSH). You also can enable monitoring using the Simple Network Management Protocol (SNMP) to exchange information about network activity between your network devices.

For more information about configuring basic WX switch properties, see "Perform Basic Administrative Tasks" on page 146.

For detailed information about configuring basic WX switch properties, see the *Wireless LAN Switch and Controller Quick Start Guide*.

Configure WX Switch Connection Information

You need to supply connection information for the WX switch on both the WX switch and in 3WXM when you make the WX a managed device. Connection information includes the IP address of the switch and how it will connect to the backbone; for example, by means of a VLAN or a port.

Configure Boot Information

You select the software image that the WX will use when reset, or optionally, the configuration file the WX will use when reset.

Equipment Installation

To physically install a WX switch:

1. Unpack and rack the WX switch in the wiring closet or data center location.
2. Plug the WX switch electrical cord into a power outlet.
3. Connect a network access cable from your existing network to one of the Ethernet ports on the switch (10/100 or Gigabit Ethernet, depending on the WX model and available interfaces on the network).

Remember the port number you used. You will need to know this when performing the initial setup of the switch.

4. Connect a serial interface to the console port of the WX switch to access the console's CLI for initial setup.

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To physically install MAPs:

1. Instruct the cabling installer to run the Cat. 5 Ethernet cable from the closest wiring closet to intended location of the MAP.
2. Unpack the MAP, and select the appropriate mounting kit for your installation location.
3. Install the MAP at the indicated location on the floor.
4. Connect the Cat 5. Ethernet cable(s) to the MAP.
5. At the wiring closet, connect the MAP to the infrastructure equipment:
   a. If you are directly connecting the MAP to a WX switch, plug the other cable end(s) to the indicated port(s).
   b. If you are indirectly connecting the WX to the switch, plug the other cable end(s) to an available network port on the wiring closet switch. If the switch does not supply PoE, then ensure that a mid-span PoE device is inserted in-line with the connection.

Deployment

Deployment is when WX configuration information in the 3WXM network plan is sent to your WX switch.

Configuration changes are collected in 3WXM when you save them, but are not applied to WX switches until you send the configuration to the WX switch and deploy the configuration to your network. Any changes you make to your network in 3WXM are saved, but not applied to your network until they are deployed. This method makes it easy to apply configurations simultaneously to multiple WX switches, or you can deploy changes to a single WX switch.

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Management and Monitoring

Understanding the management and monitoring tools available in 3WXM can help you to quickly identify and correct problems in your wireless network, as well as to provide you with the statistics and reporting information you need to optimize your network.

This section discusses the following management and monitoring features:

- Network Status
- RF monitoring
- Client monitoring
- Rogue detection
- Event logging
- Verification
- Reporting

Network Status

3WXM provides summary status on devices in the network at the mobility domain, switch or MAP level. View the summary status as the initial step in monitoring. Summary status displays the operational status of WX switches, MAP access points, and their radios (whether they are up or down).

In addition, 3WXM collects network statistics for devices, including system-level events and statistics for the wired network.

The Alerts panel in the bottom, left panel in 3WXM displays top-level status information. The Alerts panel provides you with summary error and warning information for the following areas:

- Configuration—indicates network plan configuration issues
- Network—indicates managed network issues
- Rogue detection—identifies the number of rogue APs detected
- Local changes—indicates changes in 3WXM that can be deployed to the network
- Network changes—indicates configuration changes in the network

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You can display a topology view of your network, including the state and relationship of devices. You can right-mouse click on a device in the topology to display the status of that device. The display can include the wired network, third-party APs, and rogue access points (access points that are not authorized to operate in your network).

You also can set thresholds for events. If the threshold is crossed, the affected device is flagged, and a star is placed beside the parameter that triggered the threshold.

RF Monitoring

RF monitoring provides you with current and historical information about your radio health and activity. Data collected for the RF environment and the RF neighborhood includes the following items:

- RF environment
  - Channel
  - Noise
  - CRC errors
  - PHY errors
  - Packet retransmissions
  - Percent utilization
- RF neighborhood
  - Transmitters (heard by this radio)
  - Listeners (who heard this radio)
  - Neighbors
  - BSSID to SSID mapping
  - Channel
  - RSSI

Statistics collected for the RF environment provides data on a per-channel basis. You can view noise levels, cyclic redundancy check (CRC) and PHY errors, packet retransmissions and percent utilization.

Data collected for the RF neighborhood displays the neighboring radios. This information can be viewed as a list of radios heard by a particular radio, as well as a list of radios who can hear a particular radio.

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You also can display trending information on a per-radio basis. Trending collects radio statistics and charts them on a time basis. For example, you could display average throughput rates for the previous 30 days, week, or day. You can display and print the charts from 3WXM, as well as generate a report.

Client Monitoring

Client monitoring provides current and historical information about the clients using your network, including client activity, watch list clients, current client sessions, and the ability to locate clients at your site. 3WXM displays the data that WX switches collect on user sessions—either for a single user, users associated with a MAP, users associated with a specific radio, or users added to a watch list.

By viewing monitoring information for a user or a group of users, you can troubleshoot problems originating from bandwidth constraints or roaming patterns. You can collect statistics and view reports on:

- Client associations, authentication, and authorization failures
- Client activity, such as roaming and successful authorization
- Current session status, location history, and statistics
- Specifics on users over a period of time; information can be gathered up to 30 days for session status, location history, client errors, and client activity on users you place on the watch list

Rogue Detection

A rogue AP is an access point that is not authorized to operate in or near your network. You can use RF countermeasures to deny service to or from a targeted rogue AP, and render them ineffective. Once a rogue AP is detected and reported, the closest 3Com MAP is assigned to perform RF countermeasures. By spoofing various 802.11 control messages, the MAP's countermeasures disrupt association and authentication attempts to the rogue AP by any new clients. This also disrupts any active communications between any existing client and rogue AP.

You can collect and statistics and view reports on:

- Current rogue list, aggregated for the whole network
- Current hour rogue list
- Current day rogue list
- 30 days of rogue history, using best listener data

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- Rogue lifecycle events (when the rogue was first seen, by whom, and when it went away)
- Counter-measure activity

The number of currently detected rogues is conveniently displayed in the Alerts panel.

Event Logging

3WXM incorporates a powerful and flexible display interface for all events collected by the system. Events are stored on a per-WX basis and are collected continuously. Customizable filters can be created to easily drill down to specific information the event log database. You can filter events based on:

- Category
- Severity
- Date and time ranges
- WX switch
- 3WXM client and services log
- Specific text string matches

Verification

Both configuration verification and network verification rules are checked for any inconsistencies or problems. Verification rules include "instant fix" resolutions. Instant fix resolutions are errors that can be automatically fixed, or alternatively providing a hot link to the object containing the error.

You can selectively disable any rule. Disabling a rule is useful if you wish to ignore a warning and do not want to see it displayed anymore. The number of configuration and network errors or warnings are conveniently displayed in the Alerts panel.

Reporting

3WXM uses a database to collect and store client, RF, and other system dynamic data, such as statistics, status, events, and traps. You can generate reports from the monitoring and configuration data collected in the database. A report can have a selectable scope and a selectable time period and in some cases, query filter parameters. See Table 8 for a listing and description of the reports you can generate in 3WXM.

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Table 8 3WXM Reports

Report	Description
Configuration Reports	
Inventory Report	Provides information about the WX switches and MAPs in your network.
Mobility domain configuration	Provides a configuration overview, providing data that spans multiple WX switches. For example, it contains information about the AAA/RADIUS setup, SSIDs, and where they are configured.
Wireless Switch (WX) Configuration	Provides details on a WX configuration.
Site Survey Order	Provides a map of your site that can be used to guide a site survey.
Work Order	Provides information installers use to physically install WX switches and MAPs.
Monitoring Reports	
Client Session Summary	Displays summary data for sessions in the selected scope.
Client Session Details	Displays detailed session information.
Client Errors	Provides data on client-related health in the network over time; for example, if there is a large number of association failures in some area of the network.
Watch List Clients	Contains detailed information for the clients on the Watch List.
Network Usage	Provides information about network resource usage and client activity.
RF Summary	Provides information about overall network health using selected radio statistics. It can be used to compare RF environments across the network and isolate potential problem areas.
Radio Details	Provides a detailed set of statistical information for each radio in the selected MAP.
Rogue Details	Provides current and historical information for a selected rogue.
Rogue Summary	Provides information for all visible rogues for a selected time.

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RF Plan Optimization

RF Plan Optimization is the importing of RF measurement data into an RF model to improve the accuracy of the model.

A network plan contains the configuration settings that determine the performance of your wireless network. Optimization of the RF model leads to a more successful RF plan. The ultimate result is an accurate visualization of your RF coverage, better-defined statistics for monitoring, and the ability to more accurately plan for and improve network performance.

You can optimize your network based on user and network statistics gathered from:

- The monitoring data in 3WXM
- A site survey

Based on RF measurement data you gather in 3WXM to optimize the RF model of a floor, you can make configuration changes in the software to improve signal strength and coverage for groups or individuals, modify MAP locations, or add additional equipment to your wireless network if statistics indicate your network has outgrown the support provided by its current deployment of WX switches and MAPs.

You also can import RF measurement data based on a site survey done outside of 3WXM. See the "Using RF Measurements from MAPs" on page 170 for general guidelines about performing a site survey.

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3 CONFIGURING WIRELESS SERVICES

Overview

A service is a concept (not a selectable item in the 3wxm interface) that represents a set of options you configure and deploy on your wireless network.

Services are configured to provide various levels of wireless network access to users, such as secure employee access, guest access, multi-hosted access, or Voice over Wireless IP (VoWIP) access.

You can configure a service to be independent of other services on your wireless network, or you may be able to share configuration components among services. For example, multi-hosted access is typically fully isolated from other services (no shared configuration), while services that provide for guest and employee access in a single corporation may share a common radio profile. In this way, you can reuse part of the service configuration for other services you want to provide. You could configure a service for employee access; then reuse part of the configuration to provide services for guest access. Each service has potential authentications (802.1X, web page, MAC address, or "last resort") and potential encryptions (802.11i, WPA, WEP, or unencrypted).

This chapter contains examples to help you configure the following types of service sets:

- Employee access (802.1X)
- Guest access (WebAAA)
- Voice over IP (MAC AAA)

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Configure Employee Access Services

Services for Employee access are typically configured to provide secure, encrypted access to the wireless network.

The following sections provide information about how to configure Employee access:

- "Task Table" on page 52
- "Step Summary" on page 56
- "Example: Configure Employee Access" on page 57

Table 9 on page 53 contains the tasks you need to perform to configure Employee access services. The summary provides the configurable options you should set. The section "Example: Configure Employee Access" on page 57 guides you through the primary wizards and pages in 3WXM to configure Employee access services.

Task Table

Table 9 contains the tasks you need to perform to create a service for employee access. For a summary of configurable items, see "Step Summary" on page 56. For detailed steps about how to perform each of these tasks, see "Example: Configure Employee Access" on page 57.

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Table 9 Creating a Service for Employee Access

Task	Path	Primary Parameters to Configure
"Step Summary" on page 56	Expand the WX switch icon in the Organizer panel; right-click **Service Profiles** > **Insert** > **Service Profile**. The Service Profile wizard is displayed	**1** From the Create Service Profile wizard: ▪ SSID name: enter name ▪ SSID type: select encrypted ▪ Beacon: select *yes* (to advertise the SSID) **2** Click **Encryption** tab: ▪ Security mode: select WPA ▪ 802.1X Auth Enabled: select *yes* ▪ TKIP enabled: select *yes* ▪ Click **Finish**
"Create a Radio Profile" on page 59	Expand the WX switch icon in the Organizer panel; right-click **Radio Profiles** > **Insert** > **Radio Profile**.	**1** From the Create Radio Profile wizard: ▪ Radio profile name: enter a name **2** From the **Service Profile** tab: ▪ Select the employee service profile in the Available Service Profiles list. ▪ Click **Add**; then click **Finish**

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Table 9 Creating a Service for Employee Access (continued)

Task	Path	Primary Parameters to Configure
"Configure RADIUS Servers" on page 61	Expand the WX switch icon in the **Organizer** panel, right-click **AAA** > **Edit**; then click **RADIUS**	**1** From **RADIUS Server** tab: ▪ Click **New RADIUS** server ▪ Name: enter server name ▪ IP Address: enter server IP address ▪ Key: enter key ▪ Authorization password: enter password ▪ Click **Next** **2** From **RADIUS Server Group** tab: ▪ Click **New RADIUS Server Group** ▪ Name: enter a group name ▪ Click **Choose Available**: select a server ▪ Click **Finish**; then click **Finish** again **3** Configure the AAA backend from a RADIUS server (not in 3WXM): ▪ Setup each WX switch as a RADIUS client. ▪ Define the 3Com vendor-specific attributes (VSAs) in the RADIUS server's dictionary. ▪ Configure each user record with authorization rules (username and password). ▪ Configure each user with either the Vlan-Name attribute (3Com VSA) or the RADIUS Tunnel-Private-Group-ID to assign users to VLANs. ▪ Configure authentication rules (802.1X, MAC, last-resort, or web authentication).

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Table 9 Creating a Service for Employee Access (continued)

Task	Path	Primary Parameters to Configure
"Specify Network Access Rules" on page 64	Expand the AAA icon in the Organizer panel; right-click **Network Access Rules** > **Insert** > **802.1X Network Access**.	**1** From **802.1X Network Access** tab: ▪ User Glob: enter ** ▪ SSID: enter SSID name **2** From **802.1X Policy** tab: ▪ Select **Enabled** ▪ EAP type: Pass-Through ▪ Optionally for an offload configuration EAP type: PEAP, EAP Sub-Protocol: MSCHAPV2 EAP certificate: install or generate by means of the CLI ▪ Click **Choose Available**: Select the RADIUS server group ▪ Click **Finish**
"Set Up VLANs on WX Switches" on page 66	Expand the WX switch icon in the **Organizer** panel, right-click **VLANs** > **Insert > VLAN**	**1** From **VLAN Setup** tab: ▪ VLAN ID: select number ▪ VLAN Name: enter name ▪ IP Address: enter IP Address **2** From **VLAN Member Selection** tab: ▪ Available Members: select port(s); click **Add** ▪ If the port is connected to an 802.1Q trunk line, select the Tag checkbox and change the tag value (if necessary) ▪ Select PVST+ (if you wish to enable it) **3** From **Spanning Tree** tab: ▪ Select STP options **4** From **Spanning Tree Port Setup** tab: ▪ Select STP port options ▪ Click **Finish**

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Step Summary The following list summarizes the fields selected or configuration items entered in the example that follows to configure Employee access:

1. Create a service profile.
   - From the Service Profile wizard, enter "Employees" as the Name of the service profile and "Employees" as the SSID.
   - Select SSID Type Encrypted. Select Beacon. Select the Fall Through Authentication as None.
   - Select Encryption. Select WPA for the Security Mode. Click **Finish**.
2. Create a radio profile.
   - From the Radio Profile wizard, enter "RadioProfile1" as the Name of the radio profile.
   - Select **Service Profile Selection**. Select the Employees service profile. Click **Add**. Click Finish.
3. Configure the RADIUS server in 3WXM.
   - From the Create Radius wizard, enter "sg1" as the Name of the server, server's IP address, secret for Key. Click **Next**.
   - Click **New RADIUS Server Group**. Enter "Group1." Click **Finish**. Click **Finish**.
4. Configure the RADIUS server.
   - Configure the RADIUS server for 802.1X. Use the recommended EAP method, PEAP + MS-CHAPv2.
   - Setup each WX switch as a RADIUS client.
   - Define any desired 3Com vendor-specific attributes (VSAs).
   - Configure each user record with either the VLAN-Name attribute or the RADIUS Tunnel-Private-Group-ID.
   - Configure authentication rules (802.1X, MAC, last-resort, or web authentication.)
5. Specify network access rules.
   - From the 802.1X Web Network Access wizard, click the **Web Network Access** tab.
   - For the User Glob value, enter "**".
   - For the SSID, enter the SSID name.

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- Click **802.1X Policy** tab. Select Enabled. Set EAP Type to Pass-Through.
- Click Choose Available. Select the RADIUS server group.
- Click **Finish**. Click **Finish** again.

6 Setup VLANs on the WX switches.

- From the Create VLANs wizard, click VLAN Setup. Select the VLAN ID number. Enter the VLAN name and the IP address.
- Click **VLAN Member Selection** tab. From Available Members, select port(s). Click **Add**
- Click **Spanning Tree** tab. Select STP options.
- Click **Spanning Tree Port Setup** tab. Select STP port options. Click **Finish**.

Example: Configure Employee Access

The following detailed steps provide an example of how to configure Employee services. You will:

- "Create a Service Profile" on page 57
- "Create a Radio Profile" on page 59
- "Configure RADIUS Servers" on page 61
- "Specify Network Access Rules" on page 64
- "Set Up VLANs on WX Switches" on page 66

In general, these same steps are required to configure other services, too. You can refer back to this section, using the summary list or the task table, with configuration options for "Configure Guest Access Services" on page 69 or "Configure Voice over Wireless IP Service" on page 77.

Create a Service Profile

A service profile contains the configuration for the service you want to offer, such as employee access, guest access, or VoWIP.

For more information about service profiles, see "Wireless Configuration" on page 36. For more information about service sets, see "Which Services To Provide?" on page 30.

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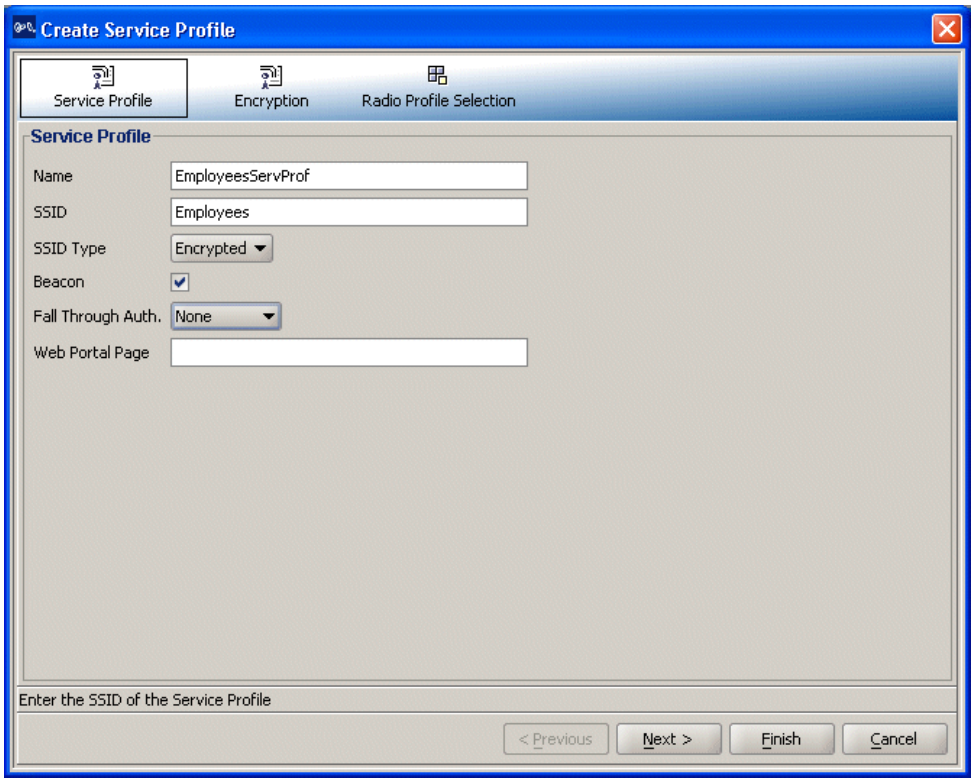
To create a service profile:

1 Expand the WX switch icon in the Organizer panel, and select **Service Profiles** > **Insert > Service Profile**.

The Create Service Profile wizard is displayed.



2 Enter the service profile and SSID names, and select SSID Type Encrypted.

3 Select Beacon (to advertise this SSID).

4 Select None for the type of Fall Through Authentication.

Authentication is generally attempted in the following order: 802.1X authentication, MAC authentication, then fall through authentication. For more information about authentication, see "AAA Security Configuration" on page 38.

5 Click **Next**. The Encryption wizard is displayed.

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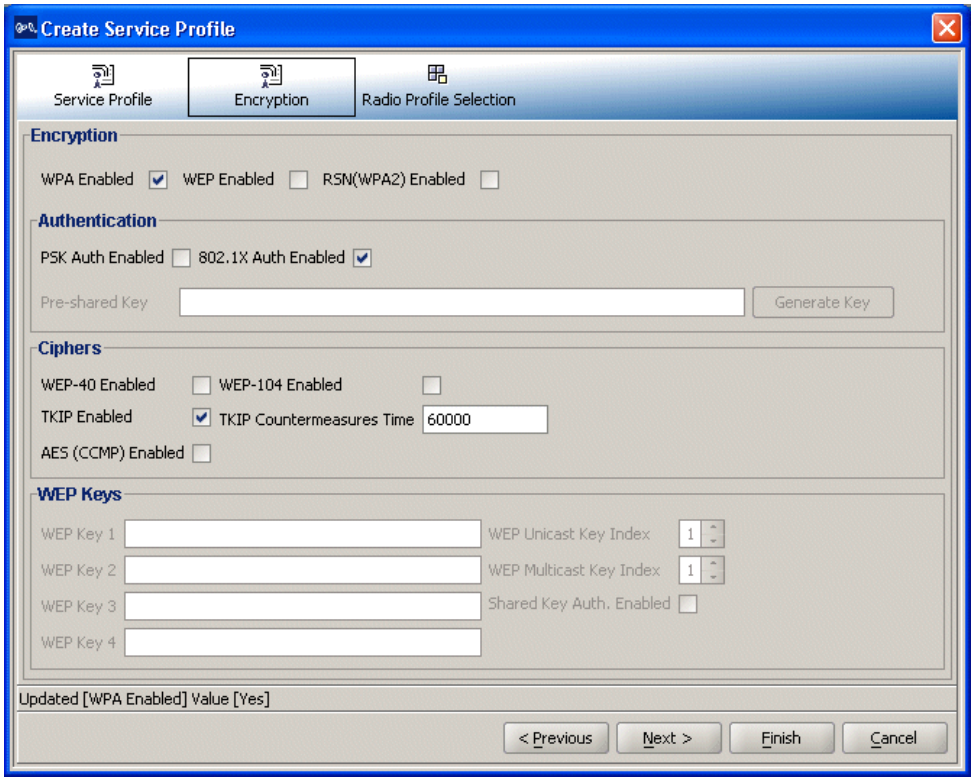

6 Click next to WPA to enable it.

The 802.1X Auth Enabled and TKIP Enabled options are automatically selected when you enable WPA.

7 Click **Finish**.

The service profile Employees is displayed in the Organizer panel.

Create a Radio Profile

You configure a radio profile to set attributes that you can apply to multiple radios. Rather than configuring each radio individually, the radio profile is applied to multiple radios that you select. Service profiles are mapped to radio profiles.

The radio profile can contain RF Auto-Tuning settings and IEEE 802.11 settings that control how the data is received and transmitted.

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MAPs (and consequently, radios) need to be added to 3WXM after creating a radio profile. For more information about adding radios, refer to one of the following:

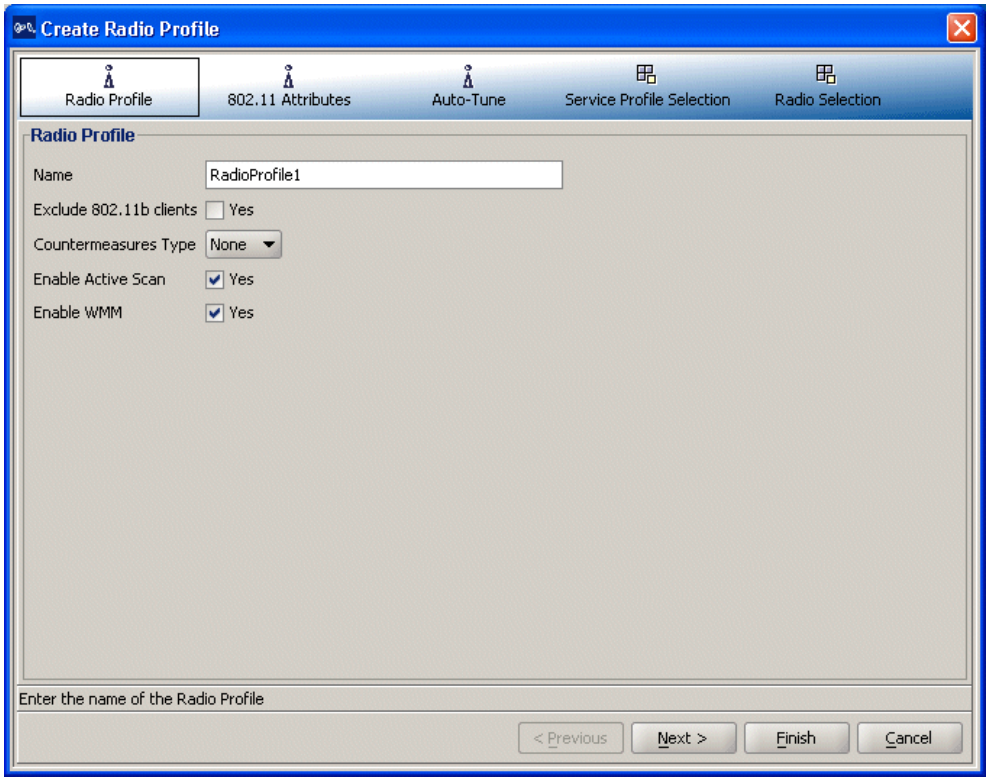
- "Using RF Auto-Tuning" on page 91
- "Using RF Auto-Tuning with Modelling" on page 99
- "Using RF Planning" on page 113

To create a radio profile and map a service profile to it:

1 Expand the WX switch in the tree topology to which you want to add a radio profile.

2 Right-click **Radio Profiles** > **Insert**.

The Create Radio Profiles wizard is displayed.



3 From the Radio Profile tab, enter the name of the radio profile. Click **Service Profile Selection** at the top of the wizard.

4 Select the employee service profile in the Available Service Profiles list. Click **Add**.

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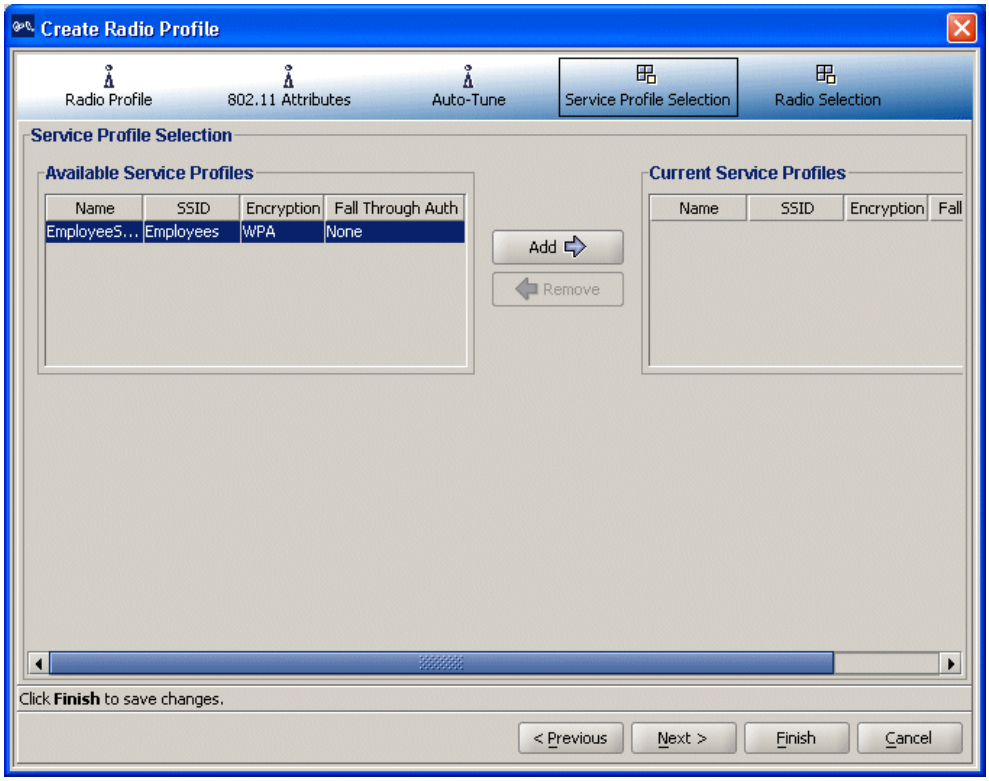

5 Click **Finish** to save the changes and close the wizard.

Configure RADIUS Servers

Remote Authentication Dial-In User Service (RADIUS) is a client-server security protocol that provides authentication, authorization, and accounting for network users and devices. A RADIUS server stores user profiles, which include usernames, passwords, and other user attributes.

To configure RADIUS servers, you must:

- Configure RADIUS server attributes in 3WXM
- Configure attributes on the RADIUS server

Configure RADIUS Server in 3WXM To configure RADIUS in 3WXM, you define RADIUS server groups (named sets of RADIUS servers). You must create at least one server group. RADIUS server groups can authenticate administrators and network users.

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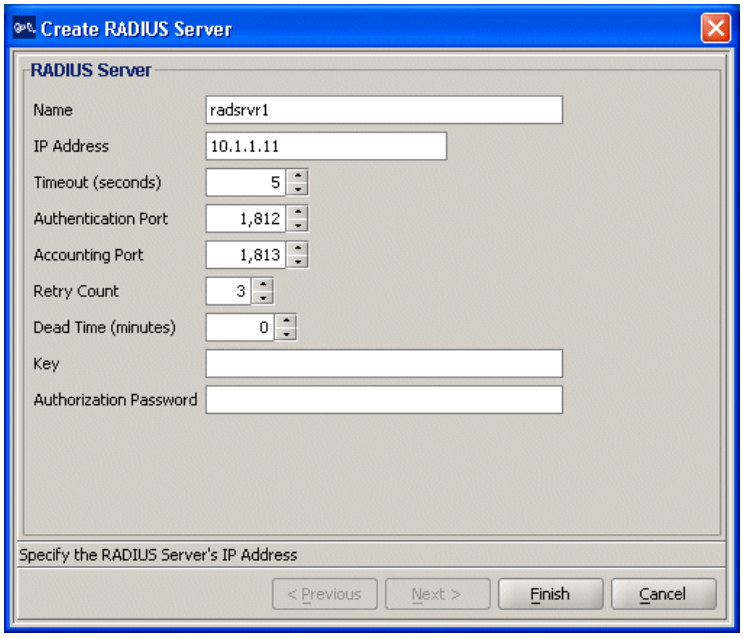
To configure the RADIUS server in 3WXM:

1 Expand the WX switch icon in the Organizer panel, right-click on **AAA**, and select **Edit**.

The Modify AAA wizard is displayed.

2 Click **RADIUS** to display the Modify RADIUS wizard, and click **Next**.

The Create RADIUS Server wizard is displayed.



3 Type the name, IP address, key, and authorization password for the server; then click **Finish**.

4 Click **Next** to display the RADIUS Server Group page.

5 Click **New RADIUS Server Group**.

6 Type a name for the group, then click **Choose Available** and select the server from the dropdown list.

7 Click **Finish** to close the Create RADIUS Server Group page.

8 Click **Finish** again to redisplay the Modify AAA wizard.

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Configure Attributes on the RADIUS Server To authenticate users, you will need to configure users either in the local database or on RADIUS servers. To configure services for Employee access, the following items should be configured on the RADIUS server.

To configure the RADIUS server:

1. Configure RADIUS server to perform 802.1X using the recommended EAP method PEAP + MS ChapV2.
2. Setup each WX switch as a RADIUS client.
3. Define any desired 3Com vendor-specific attributes (VSAs) in the RADIUS server's dictionary.

   The vendor-specific attributes (VSAs) created by 3Com are embedded according to the procedure recommended in RFC 2865, with Vendor-ID set to 14525. Table 10 describes the 3Com VSAs, listed in order by vendor type number.

Table 10 3Com VSAs

Attribute	Type, Vendor ID, Vendor Type	Rcv in Access Resp?	Sent in Access Reqst?	Sent in Acct Reqst?	Description
VLAN-Name	26, 43, 2	Yes	No	Yes	Name of the VLAN to which the client belongs.
Mobility-Profile	26, 43, 3	Yes	No	No	Name of the Mobility Profile used by the authorized client.
Encryption-Type	26, 43, 4	Yes	No	No	Type of encryption used to authenticate the client.
Time-Of-Day	26, 43, 5	Yes	No	No	Day(s) and time(s) during which a user can log into the network.
SSID	26, 43, 6	Yes	No	Yes	Name of the SSID you want the user to use. The SSID must be configured in a service profile, and the service profile must be used by a radio profile assigned to 3Com radios in the Mobility Domain.

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Table 10 3Com VSAs (continued)

Attribute	Type, Vendor ID, Vendor Type	Rcv in Access Resp?	Sent in Access Reqst?	Sent in Acct Reqst?	Description
End-Date	26, 43, 7	Yes	No	No	Date and time after which the user is no longer allowed to be on the network. Use the following format: YY/MM/DD-HH:MM
Start-Date	26, 43, 8	Yes	No	No	Date and time at which the user becomes eligible to access the network. Use the following format: YY/MM/DD-HH:MM
URL	26, 43, 9	Yes	No	No	URL to which the user is redirected after successful Web authentication. Use the following format: http://www.example.com

4 Configure each user record with authorization rules (username and password) and with either the Vlan-Name attribute (3Com VSA) or the RADIUS Tunnel-Private-Group-ID to assign users to VLANs.

Other attributes are optional.

Specify Network Access Rules

To specify network access rules:

1 Expand the AAA icon in the Organizer panel; right-click **Network Access Rules** > **Insert** > **802.1X Network Access**.

2 Enter ****** as a wildcard in the **Matching User Glob** field.

"**" is a reserved keyword that matches on all user names.

3 Enter **any** as a wildcard in the SSID field.

"**Any**" is a reserved keyword that matches on all SSID names. Click **Next**.

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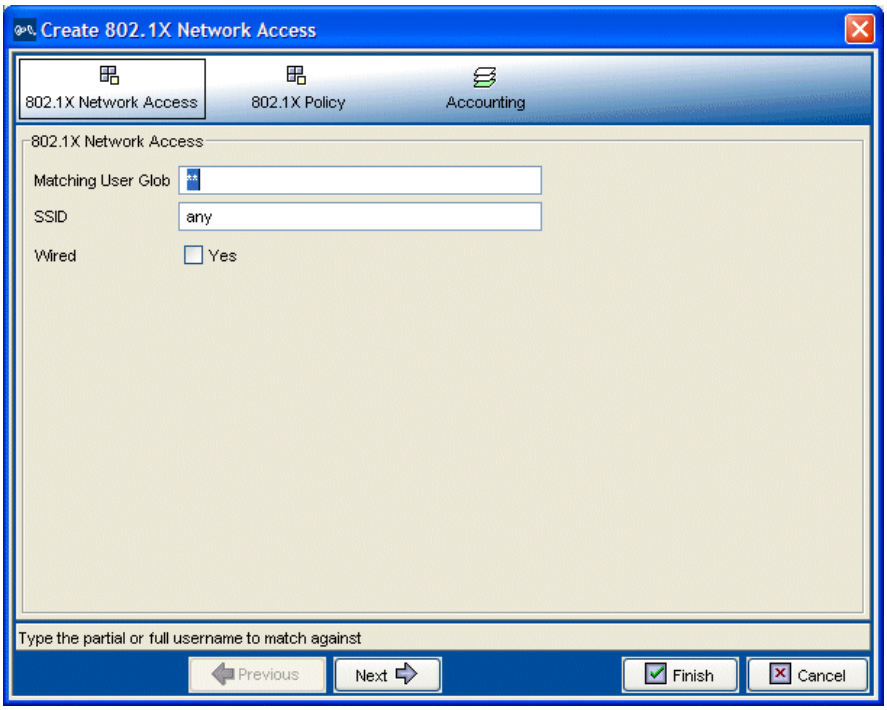

4 From the **802.1X Policy** tab, select **Enabled** and **Pass-Through** as the **EAP Type**.

This option uses the RADIUS servers to perform all the EAP and AAA processing. An EAP certificate does not need to be installed on the WX switch.

5 Click **Finish**.

You can also create an offload configuration. An offload configuration allows a WX switch to offload some of the work from the RADIUS servers. The WX switch will perform EAP processing on behalf of the RADIUS servers. If you use an offload option, you will need to use the CLI to generate or install an EAP certificate on the WX switch. To specify an offload configuration, select ***PEAP*** *as the EAP Type, and* ***MSCHAPV2*** *as the EAP Sub-Protocol.*

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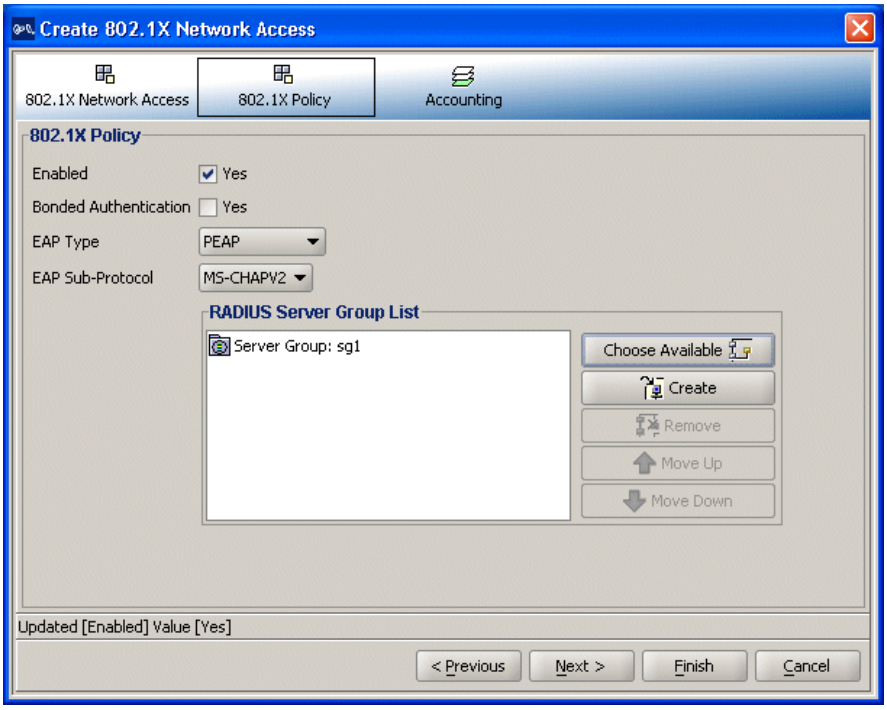

6 Click **Choose Available** and select the RADIUS server group from the dropdown list.

7 Click **Finish** to close the Modify AAA wizard.

Set Up VLANs on WX Switches

WX switches in a Mobility Domain contain a user's traffic within the VLAN the user is assigned to. For example, if you assign a user to VLAN red, the WX switches in the Mobility Domain contain the user's traffic within VLAN red configured on the switches. The VLANs you set up for service sets support wireless users—they don't serve as management VLANs.

If an WX is connected to the network by only one IP subnet, the WX must have at least one VLAN configured. Optionally, each VLAN can have its own IP address. However, no two IP addresses on the switch can belong to the same IP subnet. User VLANs must be defined on at least on WX switch within the Mobility Domain.

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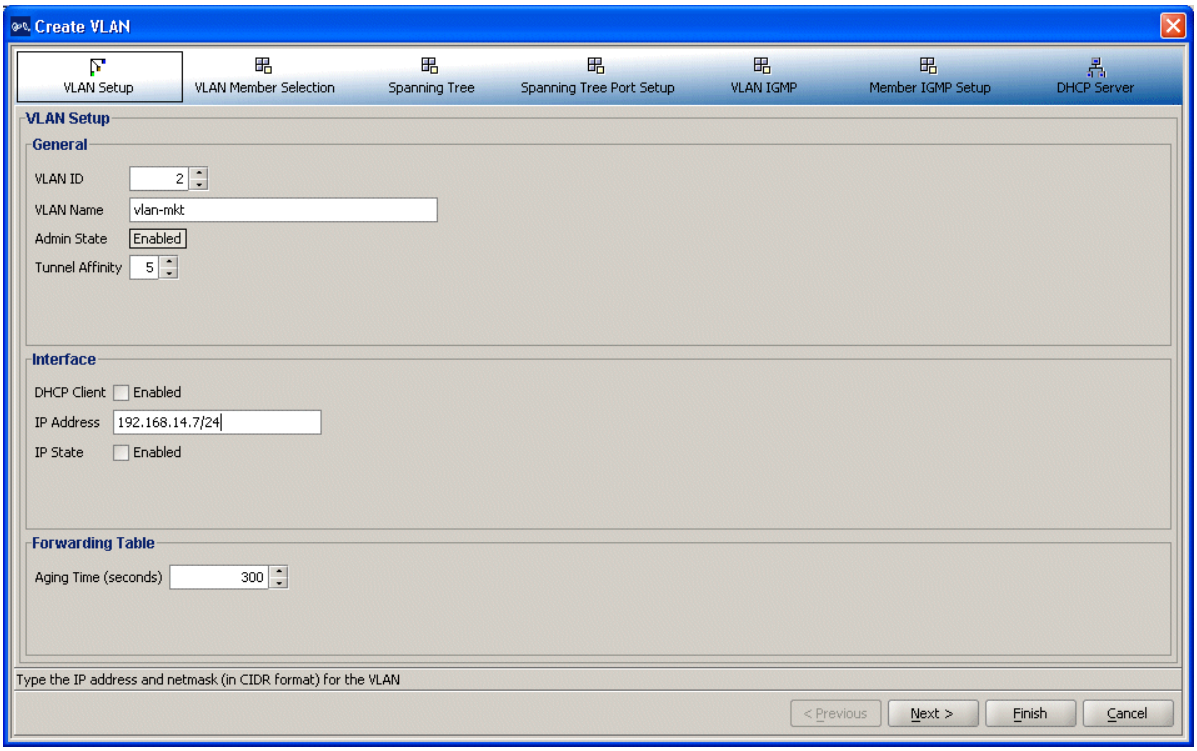
You can configure the Spanning Tree Protocol (STP) on a VLAN. STP is used to maintain a loop-free network; meaning, devices will recognize a loop in the topology and block one or more redundant paths, creating a loop-free path.

The Mobility System Software (MSS) supports Per-VLAN Spanning Tree protocol (PVST+). PVST+ allows a separate spanning tree in each VLAN. STP, disabled by default on all VLANS, is configurable for individual VLANs. STP does not run on MAP ports or wired authentication ports and does not affect traffic flow on these port types.

To set up a VLAN on a WX switch:

1 Expand the WX switch icon in the Organizer panel, right-click on **VLANs > Insert > VLAN**.

The Create VLAN wizard is displayed.



2 Select the **VLAN ID** number and enter the **VLAN Name**.

3 (Optional) To assign an IP interface to the VLAN, type the IP address or select **DHCP Client**.

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4 Click **Next**. The VLAN Member Selection page is displayed.

5 From the Available Members pane, select the network ports that will be used to reach the router interface and click **Add**.

- If the network port is an 802.1Q tagged trunk link, select the Tag checkbox for the port or port group. By default, the checkbox is not selected.
- To remove a tag for a port or port. Double-click the Tag Value column for the port or port group. Change the tag value.

If you specify a tag value, 3Com recommends that you use the same value as the VLAN number. 3Com wireless switches do not require the VLAN number and tag value to be the same, but other devices may do so.

6 (Optional) If you want to add STP to a VLAN, select the **Spanning Tree** tab and set options.

7 (Optional) For STP, select the **Spanning Tree Port Setup** tab and set options.

What's Next?

After you create Employee services, you can create additional services.

For information about configuring additional services, refer to:

- "Configure Guest Access Services" on page 69
- "Configure Voice over Wireless IP Service" on page 77

After you have created additional services, you can create your RF environment, and deploy your configuration and enable monitoring.

For information about creating your RF environment, refer to:

- "Using RF Auto-Tuning" on page 91
- "Using RF Auto-Tuning with Modelling" on page 99
- "Using RF Planning" on page 113

For information about deploying your configuration and enabling monitoring your network, refer to:

- "Managing and Monitoring Your Network" on page 143.

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Configure Guest Access Services

Guest access is access for visitors at your location and is typically clear (no encryption).

This section contains the following information about how to configure Guest access services:

- "Task Table" on page 70
- "Step Summary" on page 71
- "Optional: Configure Mobility Profiles" on page 73

Table 11 on page 70 contains the tasks you must perform to configure Guest access services.

The "Step Summary" provides the configurable options you should set. The table contains references to the section "Example: Configure Employee Access" on page 57. The references are provided in case you want to refer back to detailed steps. However, be sure to use the configurable options for Guest access services set forth in the "Step Summary" on page 71.

Also, you can optionally configure mobility profiles for your Guest access services to limit access based on criteria, such as RF coverage area or time of day.

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Task Table Table 11 contains the tasks you need to perform to create Guest access services. For a summary of configurable items, see "Step Summary" on page 71.

Table 11 Creating a Service for Guest Access

Task	Path	Primary Parameters to Configure
"Step Summary" on page 56	Expand the WX switch icon in the Organizer panel; right-click **Service Profiles** > **Insert** > **Service Profile**. The Create Service Profile wizard is displayed.	**1** From the Create Service Profiles wizard: ▪ Name: enter Guests ▪ SSID: enter Guests ▪ SSID type: select clear ▪ Beacon: select *yes* (to advertise the SSID) ▪ Fall Through Auth: Web Portal or Last Resort (to allow guest access without authentication)
"Create a Radio Profile" on page 59	Expand the WX switch icon in the Organizer panel; right-click **Radio Profiles** > **Insert** > **Radio Profile**.	**1** From Create Radio Profiles wizard: ▪ Radio profile name: enter a name **2** From **Service Profile** tab: ▪ Select the Guest service profile in the Available Service Profiles list. ▪ Click **Add**; then click **Finish**
"Configure Local Authentication" on page 74	Expand the WX switch icon in the **Organizer** panel, right-click > **AAA** > **Edit**; click **Local User Database**. The Modify Local User Database wizard is displayed. Configuring authentication can be done more easily by first adding a user group and associating or creating users for that group.	**1** Click **User Group** tab ▪ Select **New** > **User Group** ▪ Enter: User group name ▪ Enter: VLAN name **2** Click **Choose Available** or **New** ▪ Create a new user or select a user ▪ Click **Next** ▪ Click **User Attributes**: **3** Select User Attributes ▪ Click **Finish**; click **Finish** again. **4** Repeat steps 1 – 3 for all Guests.
"Specify Network Access Rules" on page 64	Expand the AAA icon in the Organizer panel; right-click **Network Access Rules** > **Insert** > **Web Network Access**.	**1** From **Web Network Access** tab: ▪ User Glob: enter ** ▪ SSID: enter SSID name ▪ From **Authentication** tab: ▪ Select **Choose Available** > **Local** server ▪ Click **Finish**

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Table 11 Creating a Service for Guest Access

Task	Path	Primary Parameters to Configure
"Set Up VLANs on WX Switches" on page 66	Expand the WX switch icon in the **Organizer** panel, right-click **VLANs** > **Insert** > **VLAN**	Setup guest VLAN on an WX switch that can access the external DMZ subnet. **1** From **VLAN Setup** tab: ▪ VLAN ID: select number (must be unique) ▪ VLAN Name: enter name (must be unique) ▪ IP Address: enter IP Address **2** From **VLAN Member Selection** tab: ▪ Available Members: select port(s) that connect to the DMZ; click **Add** **3** From **Spanning Tree** tab: ▪ Select STP options **4** From **Spanning Tree Port Setup** tab: ▪ Select STP port options ▪ Click **Finish**
"Optional: Configure Mobility Profiles" on page 73	Expand the WX switch icon in the **Organizer** panel, right-click on a WX switch**;** select **Edit**. Click **AAA > Mobility Profile**.	**1** Click **New Mobility Profile**: ▪ Enter a Profile Name ▪ Enter: selected ▪ Select the Ports or Distributed MAPs ▪ Click **Finish**

Step Summary The following list summarizes the fields selected or configuration items entered configure Guest access.

1 Create a service profile.

- From the Service Profile wizard, enter "GuestsSrvcProf" as the Name of the service profile and "Guests" as the SSID.
- Select SSID Type Clear. Select Beacon. Select the Fall Through Authentication as "Web Portal".

2 Create a radio profile.

- From the Radio Profile wizard, enter the name of the radio profile.
- Select **Service Profile Selection**. Select the Guests service profile. Click **Add**. Click **Finish**.

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3 Configure local authentication.

- From the Local User Database wizard, click **User Group**. Select **New** > **User Group**, and enter a group name and a VLAN name.
- Add users to the group. Click **Choose Available** or **New** to add users. Click **Next**.
- Click **User Attributes**. Select User Attributes. Click **Finish**.

Although normally, setting the VLAN is required, the special web-portal user that MSS creates for WebAAA assigns the VLAN instead. Setting the VLAN for an individual WebAAA user has no effect.

4 Modify the VLAN assigned to the special user "web-portal-Guests", which MSS created when you created the "Guests" SSID with Fall Through Authentication "Web Portal". Change the VLAN from *default* to the VLAN you assigned to the WebAAA users.

- From the Local User Database wizard, click **Users**. Select "web-portal-Guests", and click **Modify**.
- Edit the name in the VLAN Name box. Click **Finish**.

5 Specify network access rules.

- From the Web Network Access wizard, click the **Web Network Access** tab. For the User Glob value, enter "**".
- For the SSID, enter the SSID name.
- Click **Authentication**. Select **Choose Available** > **Local** server.

6 Set up VLANs on the WX switches.

- From the Create VLANs wizard, click VLAN Setup. Select the VLAN ID number. Enter the VLAN name and the IP address.
- Click **VLAN Member Selection** tab. From Available Members, select port(s). Click **Add**
- Click **Spanning Tree** tab. Select STP options.
- Click **Spanning Tree Port Setup** tab. Select STP port options. Click **Finish.**

7 Optional: Configure a Mobility Profile.

- From New Mobility Profile wizard, enter the Profile Name.
- Select "Selected."
- Choose the Ports or Distributed MAPs to which you'll restrict guest users to certain geographic areas of your network.
- Click **Finish**.

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For detailed information about the steps, see the cross-references in the "Task Table" on page 70. New configuration items that were not part of the example "Configure Employee Access Services" on page 52 are included in the following sections.

Optional: Configure Mobility Profiles

Mobility Profile™ attributes allow or deny access to the network for a specific user or group of users. When you create a Mobility Profile, you specify which MAP ports, Distributed MAPs, or wired authentication ports are to be included. Typically, you include ports that are defined as MAP ports or Distributed MAPs. You can specify that all or no ports are included, or you can specify a list of ports to be included.

When you apply the Mobility Profile, it guests have access only through specific areas of your WLAN—if they roam outside of a designated area supported by an WX switch or certain MAPs, they no longer have access to the Internet.

After creating a Mobility Profile, you can assign it to users created in the local WX user database, or users who are authenticated and authorized by a RADIUS server. To assign it to users in the WX user database, you add the Mobility Profile name when you create or modify a user or user group. To add this on a RADIUS server, you assign the name of the Mobility Profile by using the Mobility-Profile RADIUS attribute, which is a 3Com vendor-specific attribute (VSA).

To create a Mobility Profile:

1. Right-click on a WX switch in the Organizer panel. Select **Edit**.
2. Select AAA at the top of the wizard, if not already selected.
3. Select **Mobility Profile** from the organizer list on the left side of the page, if not already selected.
4. Click **New Mobility Profile**.

   The Create Mobility Profile wizard appears.
5. In the Profile Name box, type the name of the Mobility Profile.

   The name can be up to 16 alphanumeric characters, and it cannot contain tabs.

The Mobility Profile Name has to be defined as an authorization attribute in the defined users or user groups in the local database.

6. In the Ports list, specify ports to include in the Mobility Profile:

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- **All**—Include all MAP or wired authentication ports. Go to step 13.
- **Selected**—Include a selected list of ports. Go to the next step.
- **None**—Include no ports. Go to step 13.

7 Click **Choose Available**. The Physical Port Selection dialog box appears.

8 Select the ports to be included in the Mobility Profile. To make multiple selections. press **Shift** (for contiguous items) or **Control** (for noncontiguous items) while clicking items.

9 In the Distributed MAPs list, specify the Distributed MAPs to include in the Mobility Profile:

- **All**—Include all Distributed MAPs. Go to step 13.
- **Selected**—Include a selected list of Distributed MAPs. Go to the next step.
- **None**—Include no Distributed MAPs. Go to step 13.

10 Click **Choose Available**.

11 Select the Distributed MAPs to be included in the Mobility Profile.

12 Click **Close**. The Create Mobility Profiles dialog box is active.

13 Click **Finish** to save the changes and close the wizard.

Configure Local Authentication

The WX switch contains a local database that can store user information for a 3Com WLAN. You can use the local database to create users and authenticate them, or you can use the local database in conjunction with a RADIUS server. For example, although you might use a RADIUS server to manage most users, you could define IT staff as users in the local database in the event that the RADIUS server is unavailable.

You can create two types of users in the local database:

- Named users—These users are authenticated by username and password and are assigned to specific VLANs. Users include administrators and network users. You can group these users by creating user groups, in order to simplify configuration.

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- MAC address users—These users are authenticated by a MAC address. For example, devices such as PDAs or cellular phones that do not support 802.1X authentication are identified when the WX switch discovers the MAC addresses of these devices from received frames. The MAC address is the username and is authenticated by the local database. You can group these users by creating user groups. MAC address users and user groups cannot be assigned administrative access to the WX switch.

To create a user group and named Guest users:

1. Expand the WX switch icon in the Organizer panel, right-click on **AAA > Edit**. Click **Local User Database**.

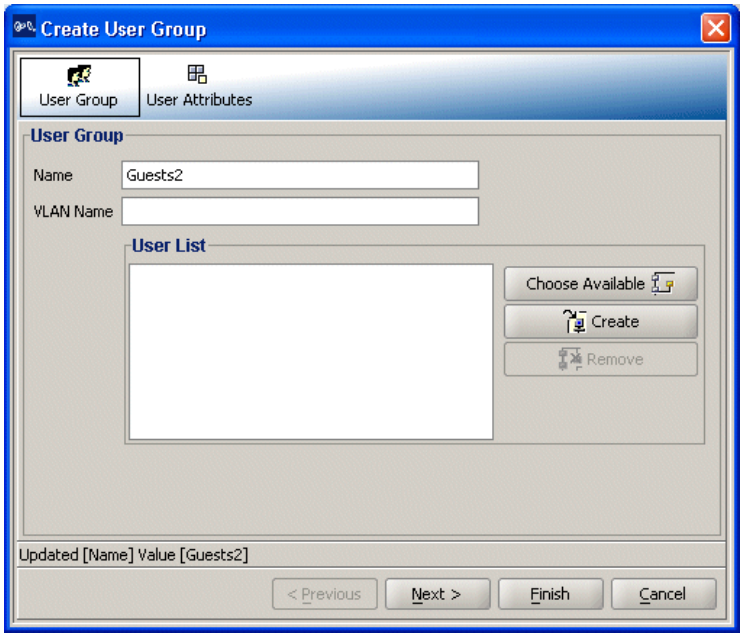
   The Modify Local Database User wizard is displayed.

2. Click **User Group**. Enter the **Name** for the user group. Click **New**.

   Also specify the VLAN name, unless the group is for WebAAA users.

If the group is for WebAAA users, do not specify the VLAN name. The VLAN name is instead associated with the special web-portal user that MSS creates for WebAAA assigns the VLAN. Setting the VLAN for an individual WebAAA user or user group has no effect.

The Create User Group wizard is displayed.



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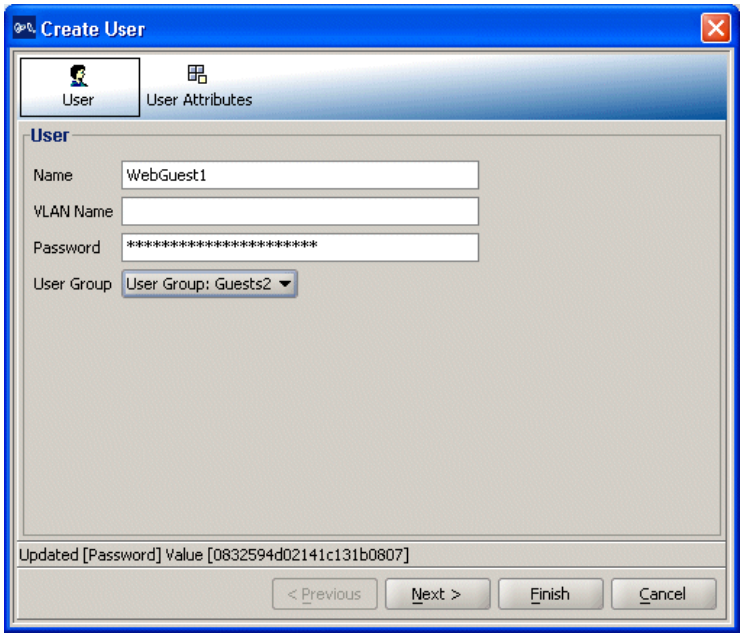
3 Click **Choose Available** to select users to add to the user group, or click **Create** to create new users.

4 Enter the user's Name and user's Password. Select the User Group to which the user belongs. Click **Next**.

The Create User wizard is displayed.



5 Select any User Attributes you would like applied to the user.

6 Click **Finish**.

What's Next?

After you create Guest services, you can create another service.

For information about configuring an additional service, refer to:

- "Configure Voice over Wireless IP Service" on page 77

You can create your RF environment, and deploy your configuration and enable monitoring.

For information about creating your RF environment, refer to:

- "Using RF Auto-Tuning" on page 91
- "Using RF Auto-Tuning with Modelling" on page 99
- "Using RF Planning" on page 113

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For information about deploying your configuration and enabling monitoring your network, refer to:

- "Managing and Monitoring Your Network" on page 143.

Configure Voice over Wireless IP Service

Voice over Wireless IP (VoWIP) is a new technology, merging VoIP (Voice over IP) with 802.11 wireless LANs to create a wireless telephone system. Organizations that add VoWIP to their wireless LANs can deploy and manage voice and data over a single wireless backbone, reserving some portion of network bandwidth to support real-time voice communications.

For a Voice over Wireless IP (VoWIP) service (sometimes also referred to simply as VoIP, or Voice over IP), you can configure either local or RADIUS server authentication, and add Access Lists (ACLs) to restrict user access.

This section contains the following information about how to configure VoWIP services:

- "Task Table" on page 78
- "Step Summary" on page 81
- "Configure Local Authentication" on page 82
- "Configure Access Control Lists" on page 84

Table 12 on page 78 contains the tasks you must perform to configure Guest access services. The table contains references to the section "Example: Configure Employee Access" on page 57. The references are provided in case you want to refer back to detailed steps. However, be sure to use the configurable options for VoWIP access services set forth in the "Step Summary" on page 81. The "Step Summary" provides the configurable options you should set.

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Task Table Table 12 contains the tasks you need to perform to create VoWIP access services. For a summary of configurable items, see "Step Summary" on page 81.

Table 12 Creating a Service for VoWIP Access

Task	Path	Primary Parameters to Configure
"Step Summary" on page 56	Expand the WX switch icon in the Organizer panel; right-click **Service Profiles** > **Insert** > **Service Profile**	**1** From **Service Profile** tab: ▪ SSID name: enter name ▪ SSID type: select Encrypted ▪ Beacon: not selected (hide presence of SSID for marginally improved security) ▪ Fall Through Auth: None **2** From **Encryption** tab: ▪ Security mode: select WEP or WPA/PSK (provides higher level of security) **3** If you select WEP: ▪ 802.1X Auth Enabled: select *yes* ▪ TKIP enabled: select *no* ▪ Click **Finish** **4** If you select WPA/PSK (Must be supported by your VoWIP device): ▪ 802.1X Auth Enabled: select *no* ▪ PSK Auth: select enabled ▪ Pre-shared Key: (64 Hex characters) or enter a pass phrase and click **Generate Key** ▪ TKIP enabled: select *yes* ▪ Click **Finish**
"Create a Radio Profile" on page 59	Expand the WX switch icon in the Organizer panel; right-click **Radio Profiles** > **Insert** > **Radio Profile**	**1** From **Radio Profile** tab: ▪ Radio profile name: enter a name **2** From **Service Profile** tab: ▪ Select the VoWIP service profile in the Available Service Profiles list. ▪ Click **Add**; then click **Finish**

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Table 12 Creating a Service for VoWIP Access (continued)

Task	Path	Primary Parameters to Configure
"Configure Local Authentication" on page 82 *or* Configure authentication using RADIUS	Expand the WX switch icon in the **Organizer** panel, right-click > **AAA** > **Edit**; click **Local User Database**	**1** Click **User**: ▪ Select **New MAC Address User** **2** Click **User**: ▪ User MAC Address: enter user's VoWIP device MAC address ▪ (Optional) MAC User Group: select a group ▪ Click **Next** **3** From **User Attributes** tab: ▪ Select User Attributes ▪ Click **Finish**
"Configure RADIUS Server in 3WXM" on page 61 *or* Configure local authentication	Expand the WX switch icon in the **Organizer** panel, right-click **AAA** > **Edit** > **RADIUS**	**1** From **RADIUS Server** tab: ▪ Click **New RADIUS** server ▪ Name: enter server name ▪ IP Address: enter server IP address ▪ Key: enter key ▪ Authorization password: enter password (required) ▪ Click **Next** **2** From **RADIUS Server Group** tab: ▪ Click **New RADIUS Server Group** ▪ Name: enter a group name ▪ Click **Choose Available**: select a server ▪ Click **Finish**; then click **Finish** again
"Configure Attributes on the RADIUS Server" on page 63	N/A	Configure the AAA backend from a RADIUS server (not in 3WXM): **1** Setup each WX switch as a RADIUS client. **2** Define the 3Com vendor-specific attributes (VSAs) in the RADIUS server's dictionary. **3** Configure user record, where user name is the MAC address (entered with dashes) **4** Configure user password, where the password is the authorization password defined in your WX RADIUS configuration (with dashes), and password authorization rules (username and password) **5** Configure each user with the Vlan-Name attribute and other optional attributes

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Table 12 Creating a Service for VoWIP Access (continued)

Task	Path	Primary Parameters to Configure
"Specify Network Access Rules" on page 64	Expand the AAA icon in the Organizer panel; right-click **Network Access Rules** > **Insert** > **MAC Network Access**	**1** From MAC Network Access page: ▪ Matching user Glob: enter ****** ▪ SSID: enter SSID name **2** From **Authentication** tab: ▪ Select **Choose Available** > **RADIUS** or **Local** ▪ Click **Finish**; then click **Finish** again
"Set Up VLANs on WX Switches" on page 66	Expand the WX switch icon in the **Organizer** panel, right-click **VLANs** > **Insert > VLAN** ***Note:*** *3Com recommends completely isolating the VoWIP VLAN as a best practice procedure in your WLAN.*	Setup VoWIP VLAN. **1** From **VLAN Setup** tab: ▪ VLAN ID: select number (must be unique) ▪ VLAN Name: enter name (must be unique) ▪ IP Address: enter IP Address **2** From **VLAN Member Selection** tab: ▪ VLAN Name: enter VLAN name for the VoWIP phones ▪ Available Members: select port(s) to reach other ports on the VoWIP VLAN or the VoWIP gateway/PBX; click **Add** **3** From **Spanning Tree** tab: ▪ Select STP options **4** From **Spanning Tree Port Setup** tab: ▪ Select STP port options **5** From VLAN IGMP tab: ▪ Uncheck **Enabled** ▪ Click **Finish**
"Configure Access Control Lists" on page 84	Expand the WX switch icon in the **Organizer** panel, right-click on **ACLs > Insert**	**1** From ACL Setup tab: ▪ Click **New**; select an **ACE** ▪ Enter ACE set up information ▪ Click **Finish** **2** From ACL Map tab: ▪ Map ACL to VoWIP VLAN ▪ Click **Finish**

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Step Summary The following list summarizes the fields selected or configuration items entered in the example that follows to configure VoWIP access:

1. Create a service profile.
   - From the Service Profile wizard, enter "VoWIP" as the Name of the service profile and "VoWIP" as the SSID.
   - Select SSID Type Encrypted. Do not select Beacon. Select the Fall Through Authentication as None.
   - Select **Encryption**. Select WEP or WPA/PSK for the Security Mode, and click **Finish**.
     - WEP—802.1X Auth Enabled is *yes*, TKIP Enabled is *no*.
     - WPA/PSK—802.1X Auth Enabled is *no*, PSK Auth is enabled TKIP Enabled is *yes.* Enter a 64 Hex character key for Preshared key, or enter a pass phrase and click **Generate Key**.
2. Create a radio profile.
   - From the Radio Profile wizard, enter "VoWIP1" as the Name of the radio profile.
   - Select Service Profile Selection. Select the VoWIP service profile. Click **Add**. Click **Finish**.
3. Configure local authentication (or configure the RADIUS server in 3WXM).
   - From the Local Database User wizard, click **User**.
   - Select New MAC Address User. Click **User**. Enter user's VoWIP device MAC address. Click **Next**.
   - From **Attributes** tab, select User Attributes. Click **Finish**.
4. Create a new MAC Network Access rule.
   - For the User Glob value, enter "**".
   - For the SSID, enter VoWIP.
   - From **Authentication** tab, select **Choose Available** > **Local**.
   - Click **Finish**. Click **Finish** again.
5. Setup VLANs on the WX switches.
   - From the Create VLANs wizard, click VLAN Setup. Select the VLAN ID number (must be unique). Enter the VLAN name and the IP address.

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- Click **VLAN Member Selection** tab. From Available Members, select the VLAN name for the VoWIP phones.
- Select port(s) to reach other ports on the VoWIP VLAN or the VoWIP gateway/PBX. Click **Add.**
- Click **Spanning Tree** tab. Select STP options.
- Click **Spanning Tree Port Setup** tab. Select STP port options.
- Click **VLAN IGMP** tab. Uncheck *enabled*.
- Click **Finish**.

6 Create ACLs.

- From the Create ACL wizard, enter a name for the ACL. The example uses "svp" for SpectraLink or "voice" for Avaya).
- Add ACEs to the ACL.
  - See "Example: Creating an ACL for SpectraLink Wireless Phones" on page 85 for ACE details.
  - See "Example: Creating an ACL for Avaya Wireless Phones" on page 87 for ACE details.
- Click **Finish**.

Configure Local Authentication

The WX switch contains a local database that can store user information for a 3Com WLAN. You can use the local database to create users and authenticate them, or you can use the local database in conjunction with a RADIUS server. For example, although you might use a RADIUS server to manage most users, you could define IT staff as users in the local database in the event that the RADIUS server is unavailable.

You can create two types of users in the local database:

- Named users—These users are authenticated by username and password and are assigned to specific VLANs. Users include administrators and network users. You can group these users by creating user groups, in order to simplify configuration.

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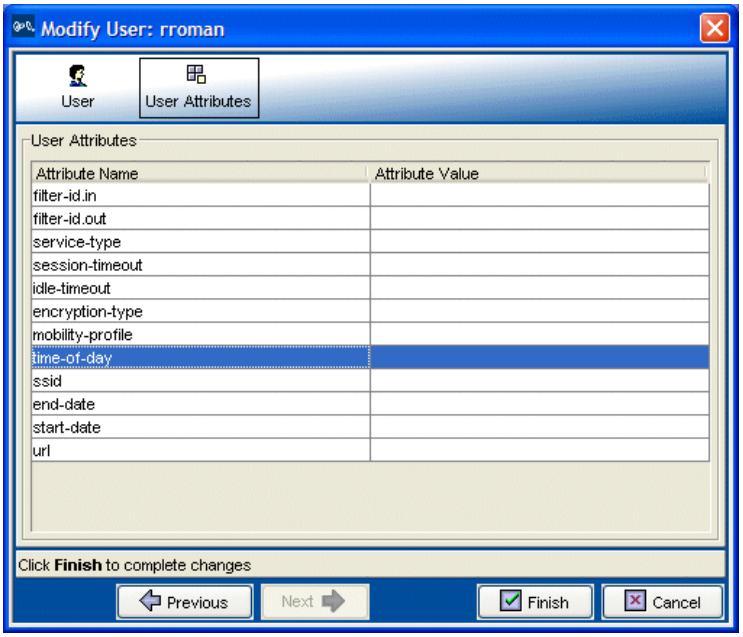
- MAC address users—These users are authenticated by a MAC address. For example, devices such as PDAs or cellular phones that do not support 802.1X authentication are identified when the WX switch discovers the MAC addresses of these devices from received frames. The MAC address is the username and is authenticated by the local database. You can group these users by creating user groups. MAC address users and user groups cannot be assigned administrative access to the WX switch.

To create MAC users

1. Expand the WX switch icon in the Organizer panel, right-click on **AAA > Edit**.
2. Click **Local User Database**.
3. Click **New**. Select **New MAC Address User**. The Create User wizard appears.
4. Enter the **User MAC Address** and the **VLAN Name** to which the user belongs.

   You can also specify that the user be part of a **MAC User Group**. Click **Next**.
5. Select any **User Attributes** you would like applied to the user.



6. Click **Finish**.

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Configure Access Control Lists

You can control access using security access control lists (ACLs). Security ACLs permit or deny traffic based on IP protocol, IP addresses and, optionally, TCP or UDP port. They also can be used to set type-of-service (TOS) and class-of-service (CoS) values in a packet.

Suggested uses for ACLs include restricting guest access from your intranet, or restricting guests from communicating with each other (using an IP access control entry).

You create an ACL by defining a series of access control entries (ACEs). ACEs are processed in the order in which they are added to the ACL. Generally, more specific checks are performed before general checks. Because of this, the order of the ACE is important within the ACL.

You can add the following types of ACEs to an ACL:

- IP—Filters packets by source and destination IP addresses, type of TOS, or precedence.
- TCP—Filters packets by established TCP connections, source and destination IP addresses, TOS, precedence, or TCP source and destination ports.
- ICMP—Filters packets by source and destination IP addresses, TOS, precedence, ICMP type, or ICMP code.
- UDP—Filters packets by source and destination IP addresses, TOS, precedence, or UDP source and destination ports.
- Layer 4 Protocol—Filters packets by source and destination IP addresses, TOS, precedence, or Layer 4 protocol.

After creating an ACL, you can assign it to users created in the local WX user database or users who are authenticated and authorized by a RADIUS server. You assign the name of the ACL by using the Filter-Id.in and Filter-Id.out RADIUS attributes. Assign the Filter-Id.in RADIUS attribute with the name of an ACL that filters incoming packets. Assign the Filter-Id.out RADIUS attribute with the name of an ACL that filters outgoing packets. The ACL name must have an **.in** or **.out** suffix.

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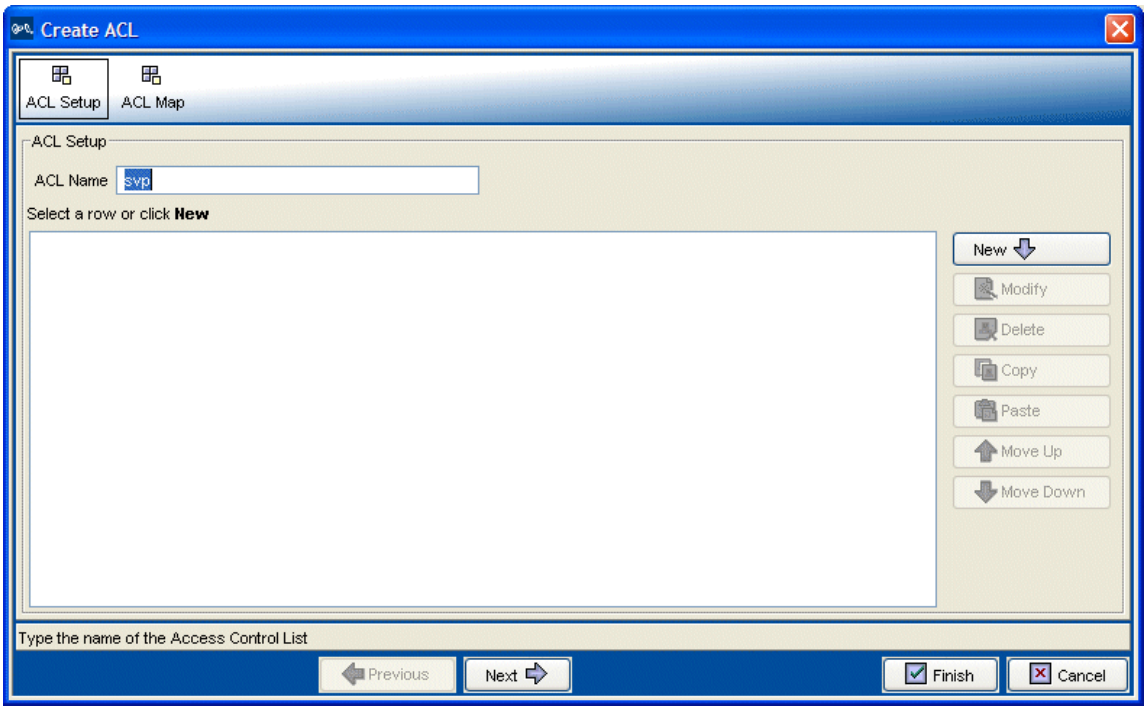
Example: Creating an ACL for SpectraLink Wireless Phones

The following example illustrates how to define an ACL on a WX switch in an environment where SpectraLink® wireless phones are used.

To define an ACL on a WX switch and add ACEs:

1 Expand the WX switch icon in the Organizer panel; right-click on **ACLs** > **Insert > ACL**. The Create ACL wizard is displayed.



2 Enter the name for the ACL in the **ACL Name** field.

3 Click **New**. Select **New L4 Protocol ACE**. Create an ACE that matches the SVP protocol (SpectraLink's proprietary protocol).

- Select 7 for the CoS value to map the ACL to an elevated priority.

If Wi-Fi Multimedia (WMM) support is disabled, use 6 or 7 for SVP, and use 4 or 5 for other VoWIP types. When WMM is disabled, the MAP forwarding queue that maps to CoS values 6 and 7 is optimized for SVP. If WMM support is disabled, use 6 or 7 for all types of VoWIP.

- Select 119 for the Protocol ID value (representing the SVP protocol).
- Click **Finish**. The Create ACL wizard is displayed again.

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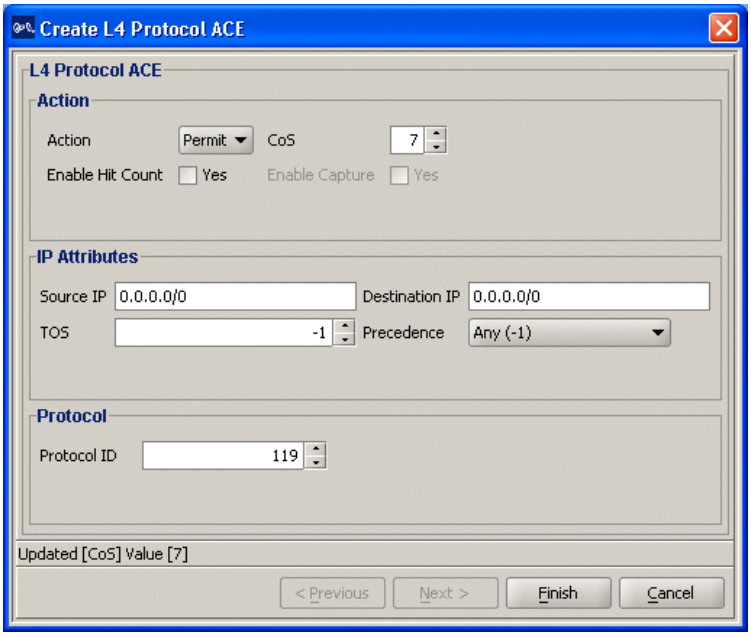
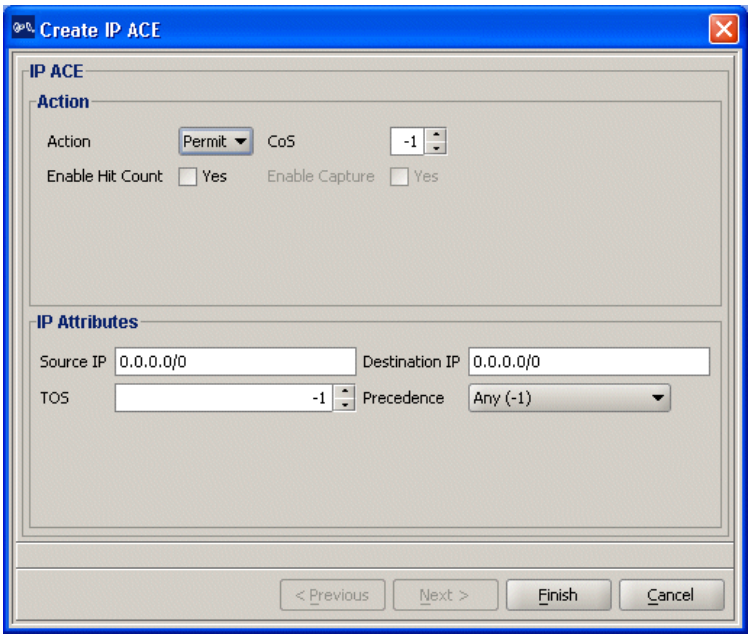


4 Click **New**. Select **IP ACE**. Create a second ACE as a "catch-all" ACE, permitting other traffic to pass at a normal priority through the WLAN.



5 Click **Finish**.

The Create ACL wizard is displayed again with the two ACEs displayed.

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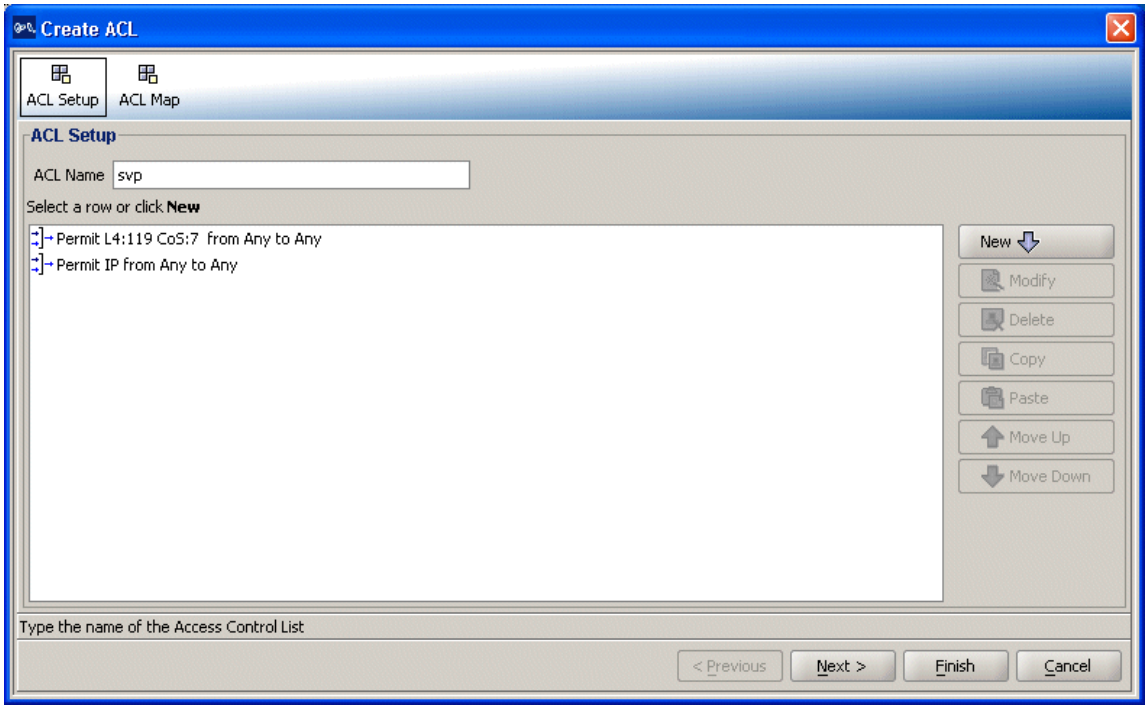
6 Click **Finish** to save the ACL.



7 Click **ACL Map** at the top of the Create ACL wizard to map the ACL.

Map the ACL to ports (or port groups), VLANs, or virtual ports. You cannot map an ACL to an MAP port or a wired authentication port.

Example: Creating an ACL for Avaya Wireless Phones

The following example illustrates how to define an ACL for an environment where Avaya® wireless phones are using Avaya Media Servers and Call Controllers in a WLAN.

To define an ACL on a WX switch and add ACEs:

1 Expand the WX switch icon in the Organizer panel; right-click on **ACLs** > **Insert**.

The Create ACL wizard is displayed.

2 Enter a name for the ACL in the **ACL Name** field.

3 Create the following ACEs for the ACL.

a Click **New**. Select **IP ACE**.

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This ACE (as well as the next one) matches the DiffServ codepoints that Avaya equipment uses for call setup and call control traffic.

- Select 7 for the CoS value to map the ACL to an elevated priority.

If Wi-Fi Multimedia (WMM) support is disabled, use 6 or 7 for SVP, and use 4 or 5 for other VoWIP types. When WMM is disabled, the MAP forwarding queue that maps to CoS values 6 and 7 is optimized for SVP. If WMM support is disabled, use 6 or 7 for all types of VoWIP.

- Select 4 for the Precedence value. This value specifies that packets with flash override precedence are filtered.
- Select 4 for the type of service (TOS) value.
- Click **Finish**.

b Click **New**. Select **IP ACE**.

- Select 7 for the CoS value to map the ACL to an elevated priority.
- Select 5 for the Precedence value. This value specifies that packets with critical precedence are filtered.
- Select 12 for the TOS value.
- Click **Finish**.

c Click **New**. Select **UDP Ace**.

This ACE roughly matches the RTP protocol used by Avaya IP Softphones for voice traffic.

- Select 7 for the CoS value to map the ACL to an elevated priority.
- Select Range for the Source Port and specify a range. The range in the example is 2048 to 65535.
- Click **Finish**

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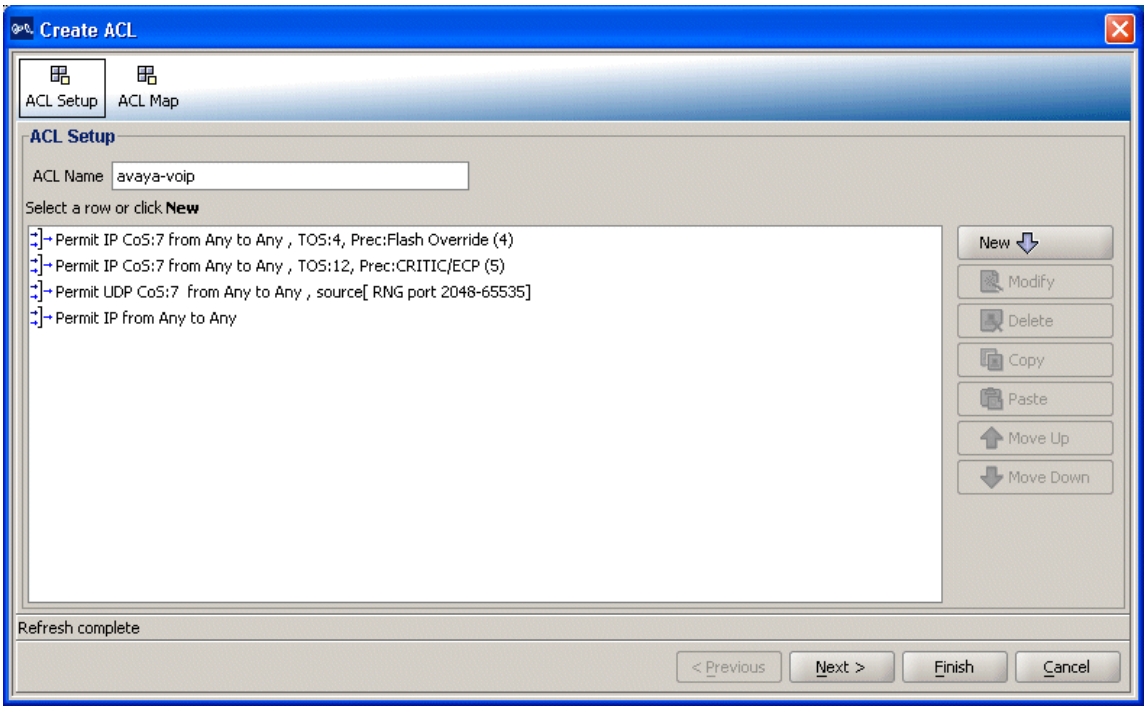
d Click **New**. Select **New IP ACE**.

This ACE is a generic "catch-all," permitting other traffic to pass at a normal priority through the WLAN.

- Click **Finish**.

4 The ACL properties are displayed.



5 Click **Finish** to save the ACL.

6 Map the ACL to ports (or port groups), VLANs, or virtual ports. Click **ACL Map** at the top of the Create ACL wizard to map the ACL.

You cannot map an ACL to a MAP port or a wired authentication port.

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What's Next?

After you create VoWIP access services, you can create another service.

For information about configuring an additional service, refer to:

- "Configure Guest Access Services" on page 69

You can create your RF environment, and deploy your configuration and enable monitoring.

For information about creating your RF environment, refer to:

- "Using RF Auto-Tuning" on page 91
- "Using RF Auto-Tuning with Modelling" on page 99
- "Using RF Planning" on page 113

For information about deploying your configuration and enabling monitoring your network, refer to:

- "Managing and Monitoring Your Network" on page 143.

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4 USING RF AUTO-TUNING

Overview

RF Auto-Tuning is a technique you can use to configure your RF (radio) network. RF Auto-Tuning is a quick method that requires minimal configuration and no RF planning or site surveys, and instead, relies on the AutoTune feature to set MAP channels and power settings.

This is a great way to quickly install a WX switch and MAPs, and observe how the network operates. The RF Auto-Tuning technique is best suited to networks containing fewer MAPs.

To learn more about the benefits of RF Auto-Tuning, see "RF Auto-Tuning" on page 32.

To use this technique:

1. Physically place your equipment (WX switches and MAPs) in their desired locations.
2. Configure initial WX switch connectivity (configure IP addresses and install certificates).
3. Upload the WX switch configuration into a 3WXM network plan.
4. Create a service profile.
5. Create a radio profile (or use the default radio profile).
6. Map your service profile to your radio profile.
7. Create your MAPs.
8. Apply a radio profile to each radio on a MAP.
9. Deploy your configuration.

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Place Your Equipment

You will need to unpack and physically install your WX switches and MAPs. For information about installing your equipment, see "Equipment Installation" on page 42.

Configure Initial WX Switch Connectivity

After installing a WX switch, you must use the command-line interface (CLI) to prepare it for configuration and management by 3WXM. Use the Web Quick Start (if available), or enter the **quickstart** command at the CLI prompt. From there, you will:

- Configure IP connectivity between the WX and 3WXM.
- Enable secure communication between the WX and 3WXM or the Web browser by installing certificates from a certificate authority (CA) or a self-generated certificate.

For more information about configuring initial WX switch connectivity, see the *Wireless LAN Switch and Controller Installation and Basic Configuration Guide.*

Upload the WX Switch Configuration into a 3WXM Network Plan

Retrieve the basic configuration information you added to the WX switch and upload it into 3WXM.

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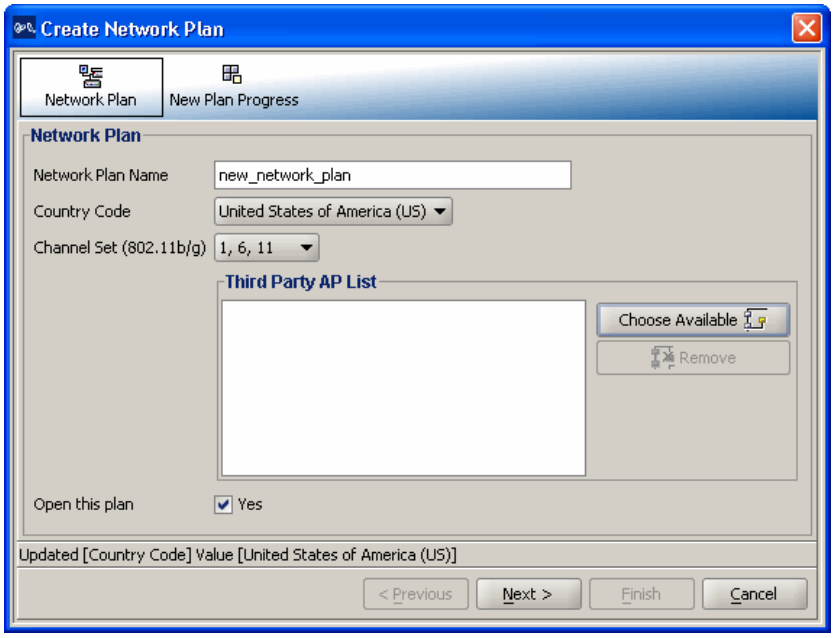
To upload the WX switch configuration into a 3WXN network plan:

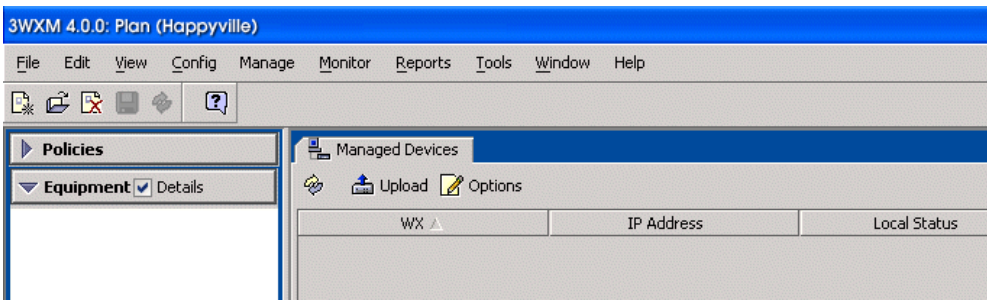
1 From the main 3WXM window, select **File > New**. The Options wizard appears.



2 Enter a name for your network plan, select a Country Code, and click **Finish**.

3 Select **Manage > Managed Devices** from the main menu bar; then click **Upload**.

The Upload Wireless Switch wizard is displayed.



4 Enter the IP address and the enable password for the WX switch containing the configuration.

5 Click **Next**.

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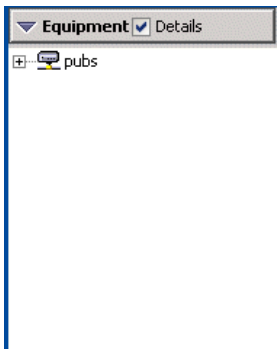
6 The certificate is verified, and the WX switch added to 3WXM.

7 The WX switch is now visible in the Equipment section of the Organizer panel on the left side of the 3WXM main window.



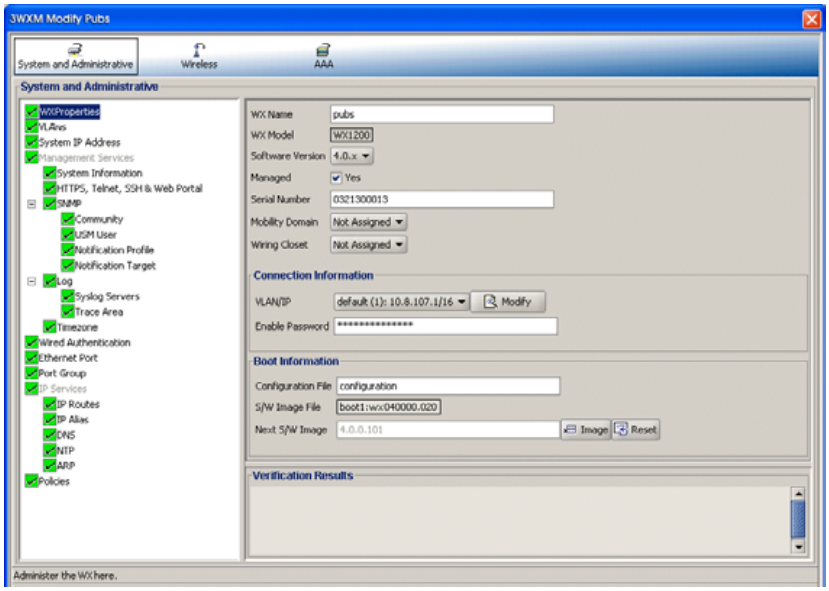
Create a Service Profile

A service profile contains the configuration for the service you want to offer, such as employee access, guest access, or multi-hosted access.

For more information about service profiles, see "Wireless Configuration" on page 36. For more information about wireless services, see "Which Services To Provide?" on page 30.

To create a service profile:

1 Right-click the WX switch you added, and select **Edit**. The Modify Switch wizard is displayed.



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2 Click **Wireless**. Click Service Profile and select **New Service Profile**.

3 Enter the name and SSID for the service profile, and the type of encryption.

4 Select whether you want to Beacon (advertise) this SSID.

5 Select the type of Fall Through Authentication. Select **None** for no authentication, **Web Portal** for web authentication, or **Last Resort**.

Authentication is attempted in the following order: 802.1X authentication, MAC authentication, then fall through authentication. For more information about authentication, see "AAA Security Configuration" on page 38.

6 Click **Finish**.

The service profile you created is displayed in the center of the Modify Switch wizard.

Create a Radio Profile and Map the Service Profile to It

To create a radio profile and map a service profile to it:

1 Right-click the WX switch you added, and select **Edit**.

The Modify Switch wizard is displayed.

2 Click Wireless at the top of the wizard. Select **Radio Profile** on the left side; then click **New Radio Profile** on the right side. The Create Radio Profile wizard is displayed.

3 Enter the name of the radio profile.

4 Click the **Auto-Tune** tab. Tune Channel is enabled by default. Select **Tune Transmit Power**.

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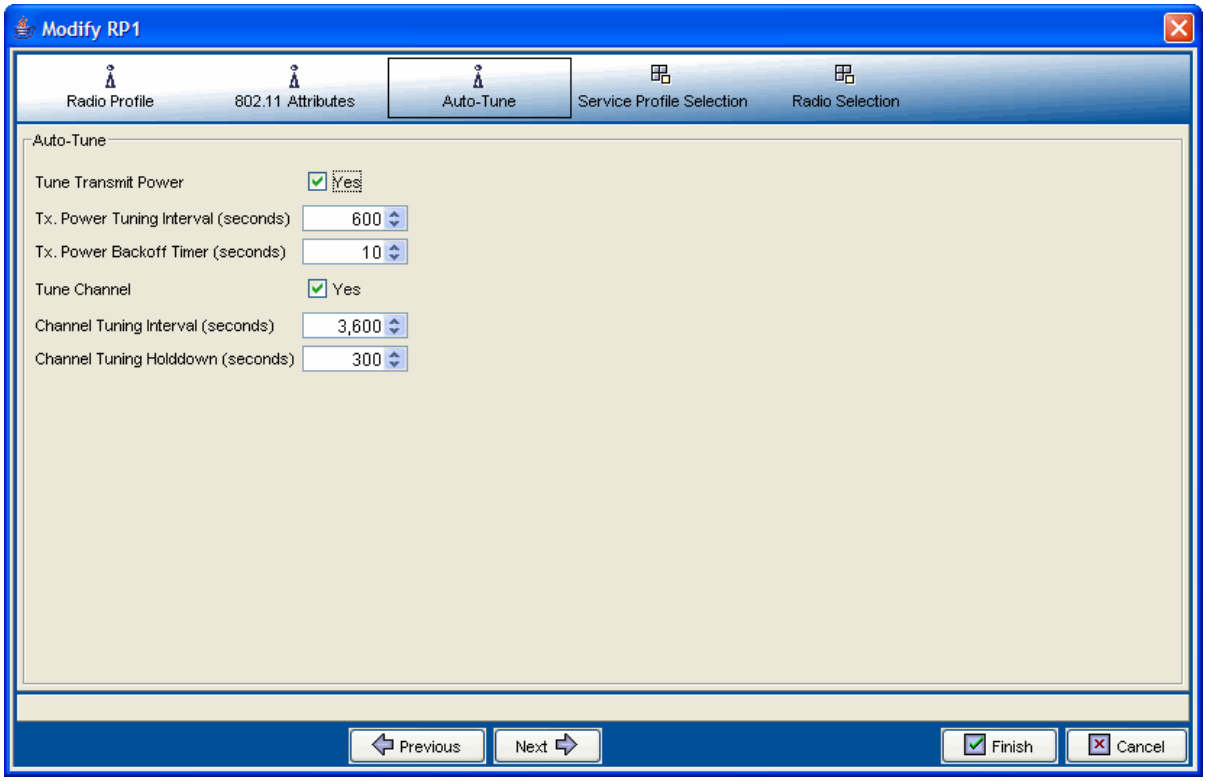

5 Click the **Service Profile Selection** tab.

6 Select the service profile that you want to map to the radio profile, and click **Add**.

7 Click **Finish** to save the radio profile configuration.

8 Click **Finish** again to close the Modify Switch wizard.

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Create Your MAPs

Depending on how your MAPs are connected to a WX switch, you need to create a *direct connect MAP* or a *distributed MAP* in your network plan in 3WXM.

A direct connect MAP is connected to the wired network through a direct 10/100 Ethernet connection to a WX switch. A distributed MAP is connected to the WX switch indirectly through other Layer 2 or Layer 3 wired networking devices.

To create a directly connected MAP in 3WXM:

1. In the Equipment area of the Organizer panel, expand the WX switch.
2. Right-click on **Port/MAPs**, right-click on a port, and select **Edit**. The Modify Ports/MAPs wizard is displayed.
3. Select the **MAP enabled** checkbox to the left of the Port number that will connect to the MAP.
4. Click **Finish**.

   The MAP appears under Ports/MAPs for the switch, in the Organizer panel.

To create a Distributed MAP in 3WXM:

1. In the Equipment area of the Organizer panel, right-click on **Distributed MAPs** under the WX switch, and select **Insert > Distributed MAP**. The Create Distributed MAPs wizard is displayed.
2. Enter the MAP name and the MAP serial number.
3. Enter the fingerprint. This is a hash value of the MAP's public encryption key, and may be printed on the back of the MAP. Alternatively, you also can display the fingerprint in the CLI, by typing **display dap status**.
4. Click **Finish**.

   The MAP appears under Distributed MAPs for the switch, in the Organizer panel.

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Apply a Radio Profile to Each Radio

When you create a MAP, a new radio (or radios, depending upon the type of MAP created) are added into 3WXM. The radios use the default radio profile in 3WXM unless you create a new radio profile and apply it to each radio on the MAP.

For more information about creating a radio profile, see "Create a Radio Profile and Map the Service Profile to It" on page 95. For more information about creating a MAP, see "Create Your MAPs" on page 97.

To apply a radio profile to a radio:

1. In the Equipment area of the Organizer panel, expand the switch, then expand the MAP.
2. Right-click on the radio and select **Edit**.
3. Click the down arrow beside the Radio Profile box, and select the radio profile.
4. Click **Finish**.

You have completed the necessary steps for configuring your RF environment.

What's Next?

After you create your services ("Configuring Wireless Services" on page 51) and following the instructions in this chapter to create your RF environment, you need to deploy your configuration and enable monitoring. Optionally, you can improve your network monitoring options by modelling your floor and defining RF obstacles.

- For information about monitoring your network, see "Managing and Monitoring Your Network" on page 143.
- For information about enhancing RF Auto-Tuning with modelling to better define your site and improve monitoring options, see "Using RF Auto-Tuning with Modelling" on page 99.

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5 Using RF Auto-Tuning with Modelling

Overview

RF Auto-Tuning with modelling is a technique you can use to configure and implement your network that builds on the RF Auto-Tuning method. You will, as the name implies, still use RF Auto-Tuning (auto tuning) to adjust power and channel settings to provide RF signals to the coverage area for your users. You'll then enhance the auto tuning feature by providing modelling information about your geographic location.

To use this technique, you will complete the tasks described in "Using RF Auto-Tuning" on page 91. Then, you'll complete the following steps in your network plan:

1. Add site information (buildings and floors) or import a floor drawing
2. Add RF obstacles (optional)
3. Add an RF coverage area

By providing some information about your buildings and floors, you add enough details into 3WXM so that you can better visualize your network topology and support improved monitoring at your site.

To learn more about the benefits of RF Auto-Tuning with modelling, see "RF Auto-Tuning with Modelling" on page 32.

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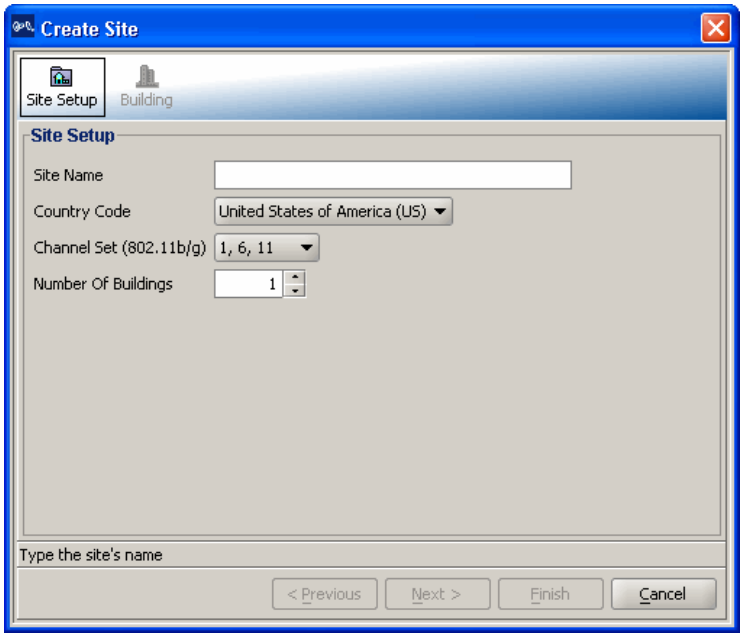
Add Site Information

By adding minimal information about your buildings and floors at your site, you support improved monitoring for your network. You can manually add building and floor information or you can import a floor. For information about importing a floor plan, see "Import a Floor Plan" on page 120.

To add site information:

1 Without selecting any object in the Organizer panel, select **Config > Insert > Site** from the main 3WXM menu. The Create Site wizard appears.



2 In the Site Name box, type a name for the site (1 to 80 alphanumeric characters, with no spaces or tabs).

3 In the Number Of Buildings box, specify how many buildings are in your site.

When you specify the number of buildings a site contains and save the site, 3WXM creates each building using the default settings. You can edit the buildings 3WXM creates or you can add new buildings.

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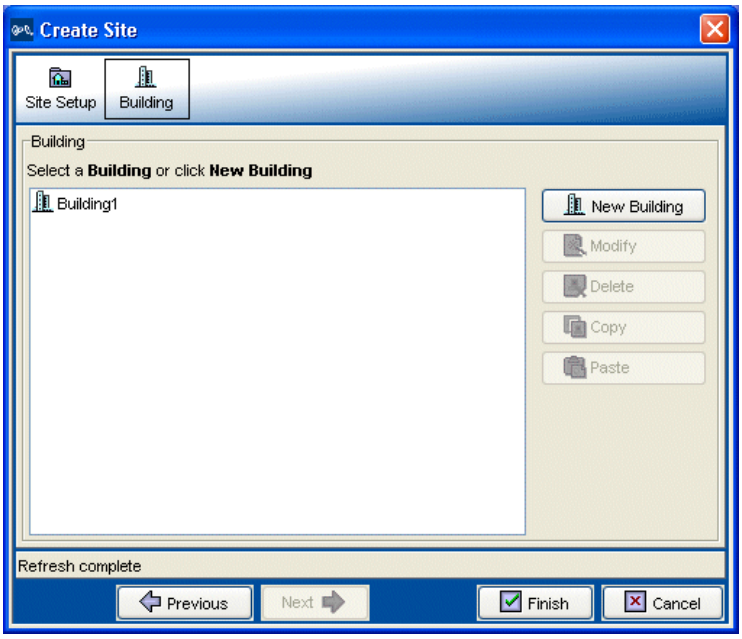
4 Click **Next** to configure building information.

The Building page appears.



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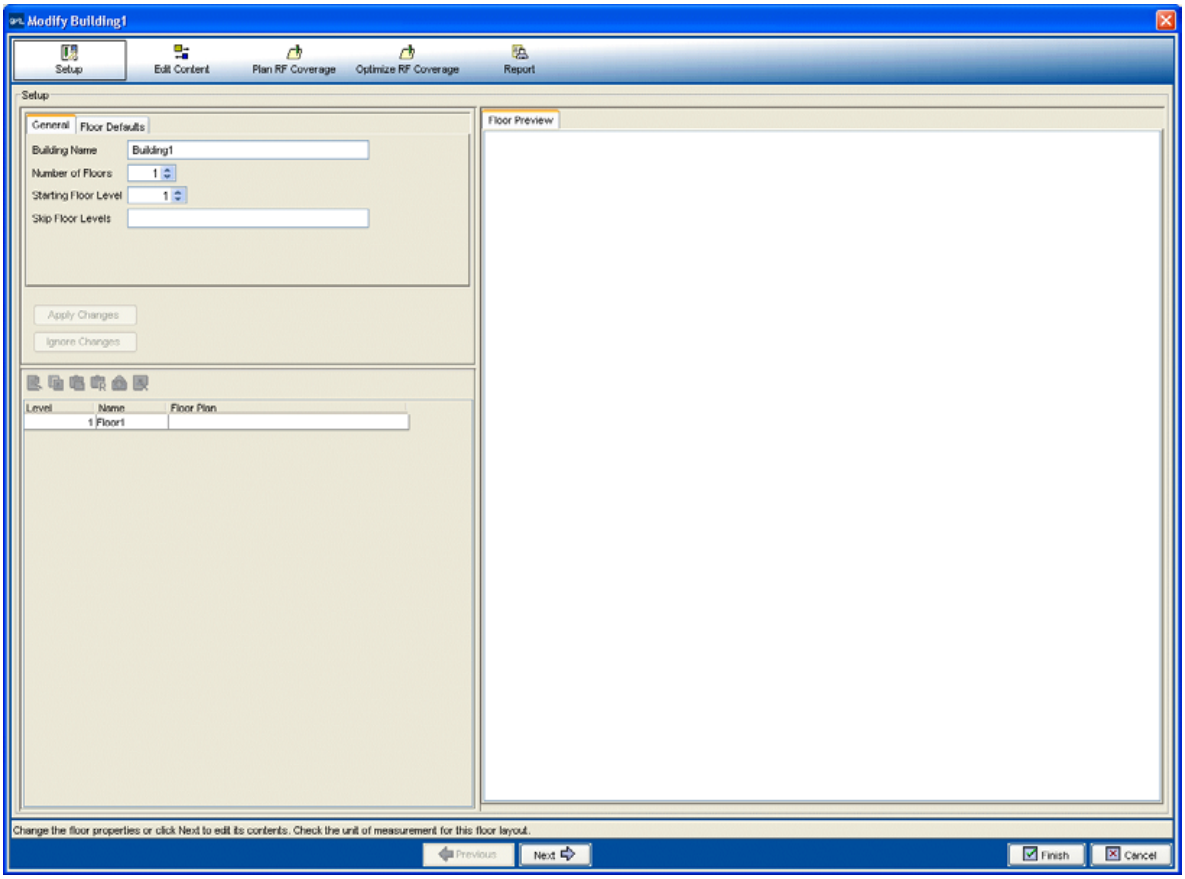
To create a building:

1 Click **New Building** to add a building to the site. The Create Building wizard appears.



2 In the Building Name box, type the name of the building (1 to 30 alphanumeric characters, with no spaces or tabs).

3 In the Number Of Floors box, specify how many floors the building has.

4 In the Starting Floor Level box, specify the floor number of the first floor in the building. To start with a subterranean floor, you can specify 0 or a negative floor number.

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5 In the Skip Floor Levels box, specify floor numbers you want to skip. Skipping floors is useful when you want to model only certain floors in a building. To enter a list of floors, use commas to separate the floor numbers (example: 1,3,7). To enter a range, use a hyphen (example: 8-12).

6 Click **Apply Changes** to apply the numbering changes to the plan.

7 Select the Floor Defaults tab to modify floor defaults, such as ceiling height, ceiling type (ceiling building material), unit of measurement, and ceiling attenuation. Click **Apply Changes**.

- The default attenuation for ceilings is 10 dB for 802.11b/g and 802.11a.
- The ceiling height is based on the surface of the ceiling where the access points will be mounted, not on the center of the plenum space between floors.

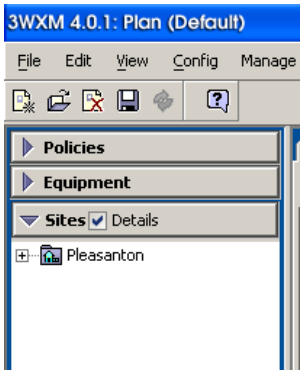
8 Click **Next**.

The Edit Content wizard is displayed.

Use the objects under **Free Draw** to draw your floor. Click on the Ruler icon on the **Floor View** tab. Set the scale of your floor.

9 Click **Finish**.

The new site is displayed in the Sites section of the Organizer panel.



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Insert RF Obstacles

Add major RF obstacles that will affect the placement of your MAPs, such as solid walls, barriers, or elevator shafts.

To add RF obstacles:

1. The Organizer panel is displayed on the left. Expand **Sites**, right-click on a building, and select **Edit**.

   The Modify Building wizard is displayed.

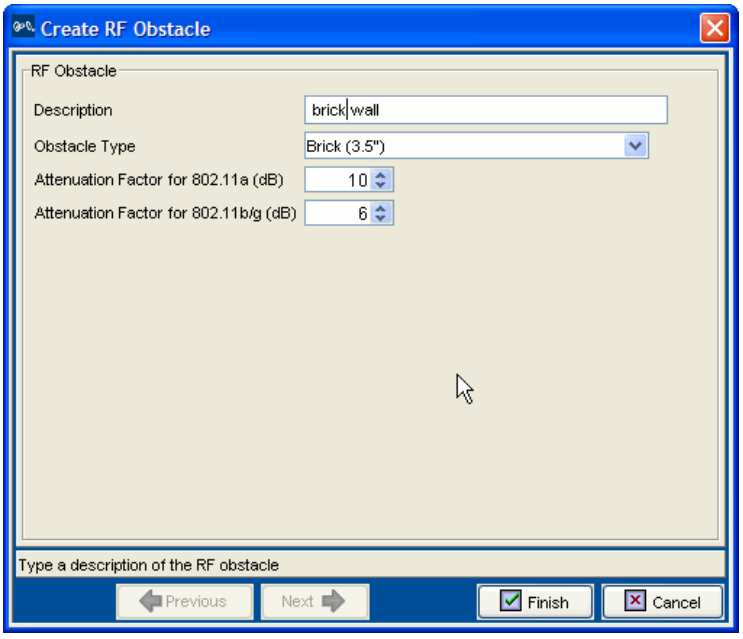
2. Select a shape under **Insert RF Obstacle** that most closely matches the RF obstacle you wish to place.

3. Click and drag the mouse to draw the location and shape of the RF obstacle on the floor.

   The Create RF Obstacle wizard is displayed.

4. Enter a description of the RF obstacle, and select the **Obstacle Type**.

   A default attenuation factor is displayed for the object type, or, you can select an attenuation factor that you believe more closely matches the RF obstacle.



5. Click **Finish**. The RF obstacle is added to your floor layout.

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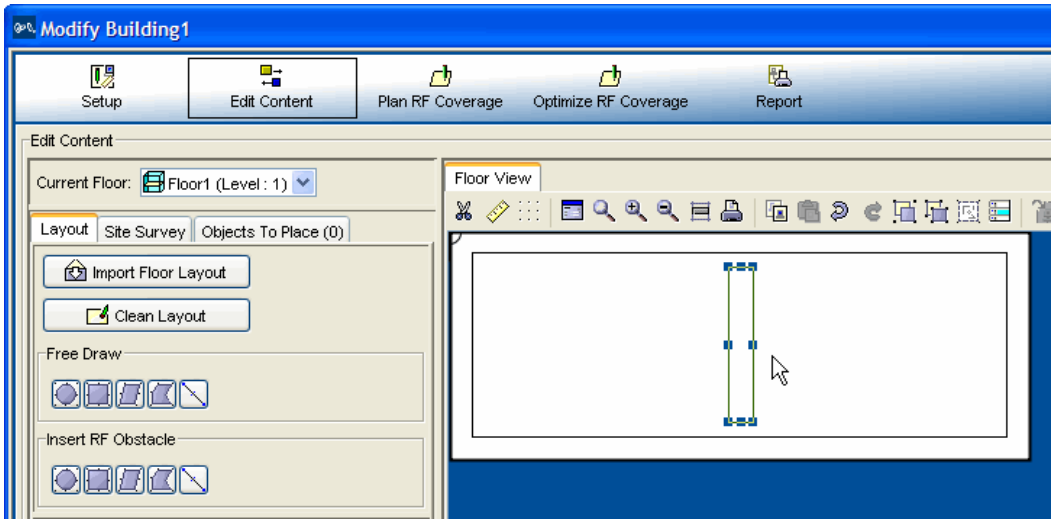
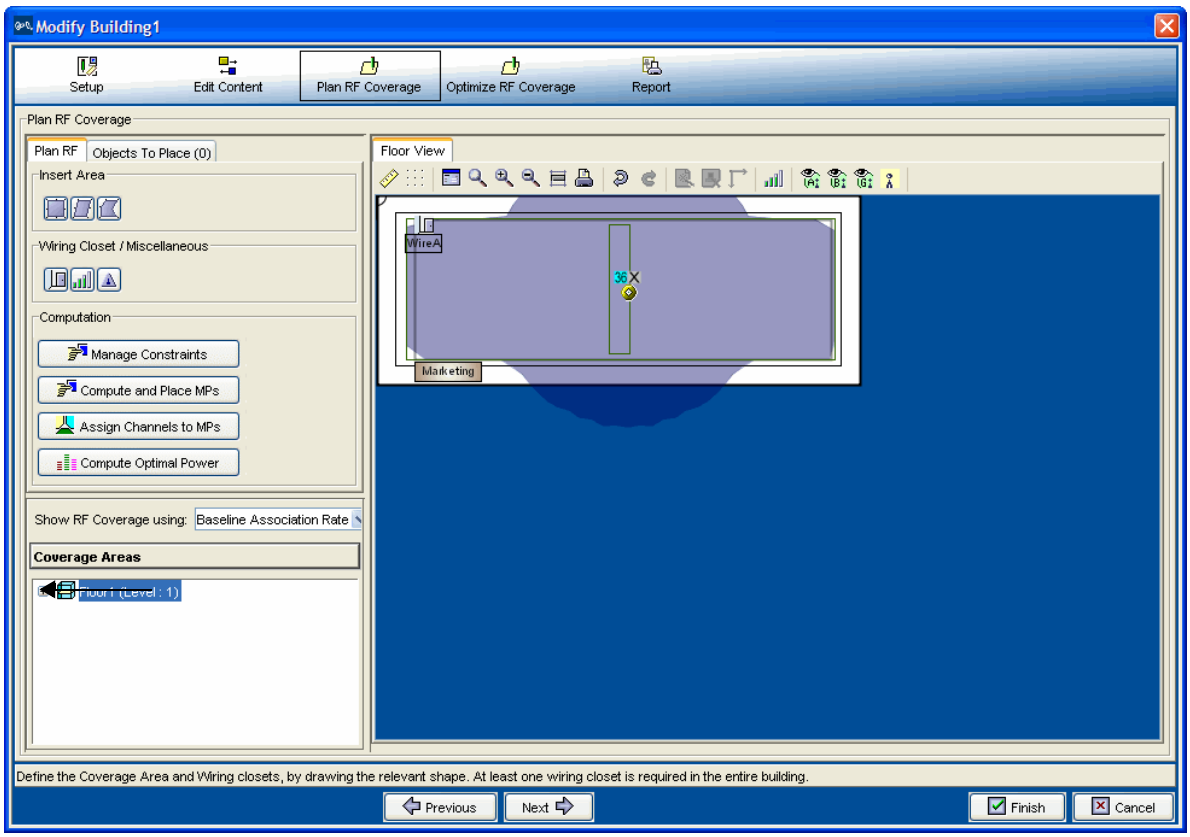


6 Click on the **A**, **B**, or **G** icon on the Floor View bar to display the coverage area for that technology.



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Create Your RF Coverage Area

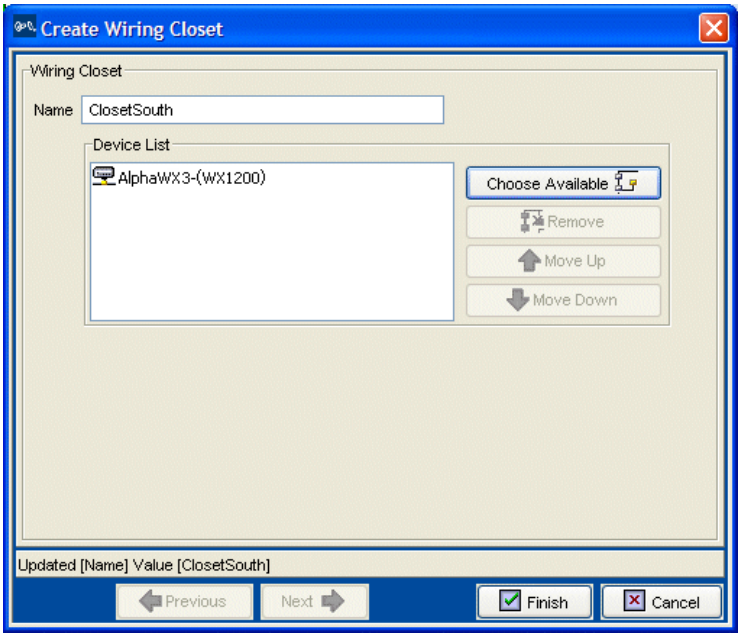
To create your RF coverage area, you create a wiring closet (mandatory if you have direct MAPs in your plan), designate an area for RF coverage, and add your *distributed MAPs* or *direct MAPs* to the coverage area. Distributed MAPs are indirectly attached through intermediate Layer 2 or Layer 3 devices. Direct MAPs are directly attached to dedicated WX switch ports.

Create a Wiring Closet

To add the location of a wiring closet to the floor plan:

1. The Organizer panel is displayed on the left. Expand **Sites**, right-click on a building, and select **Edit**.
2. Click the **Plan RF Coverage** tab.
3. Click the Wiring Closet icon under Wiring Closet/Miscellaneous. A cross hair is displayed.
4. Mouse over and click on the floor plan to mark the location of the wiring closet.

   The Create Wiring Closet wizard is displayed.



5. Click **Choose Available** and select an available switch. Click **Finish**. The wiring closet is displayed on your floor plan.

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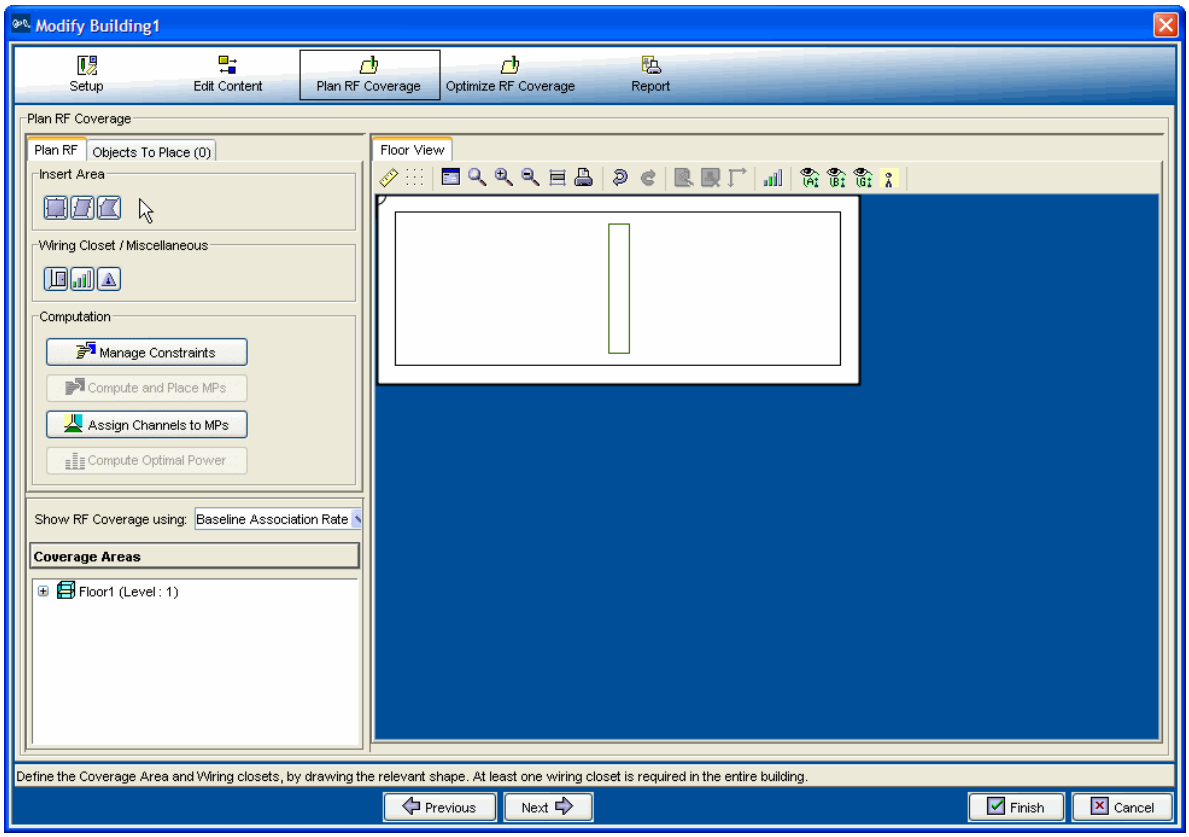
Create Your RF Coverage Area

To create your RF coverage area:

1. From the Modify Building wizard, click **Plan RF coverage**.
2. Select a shape from **Insert Areas,** and draw the RF coverage area you want to add to the floor by clicking and dragging the mouse.

   The Coverage Area Choices wizard is displayed.



3. Select one or more technologies you want to use in the coverage area.
4. Click **Next**.

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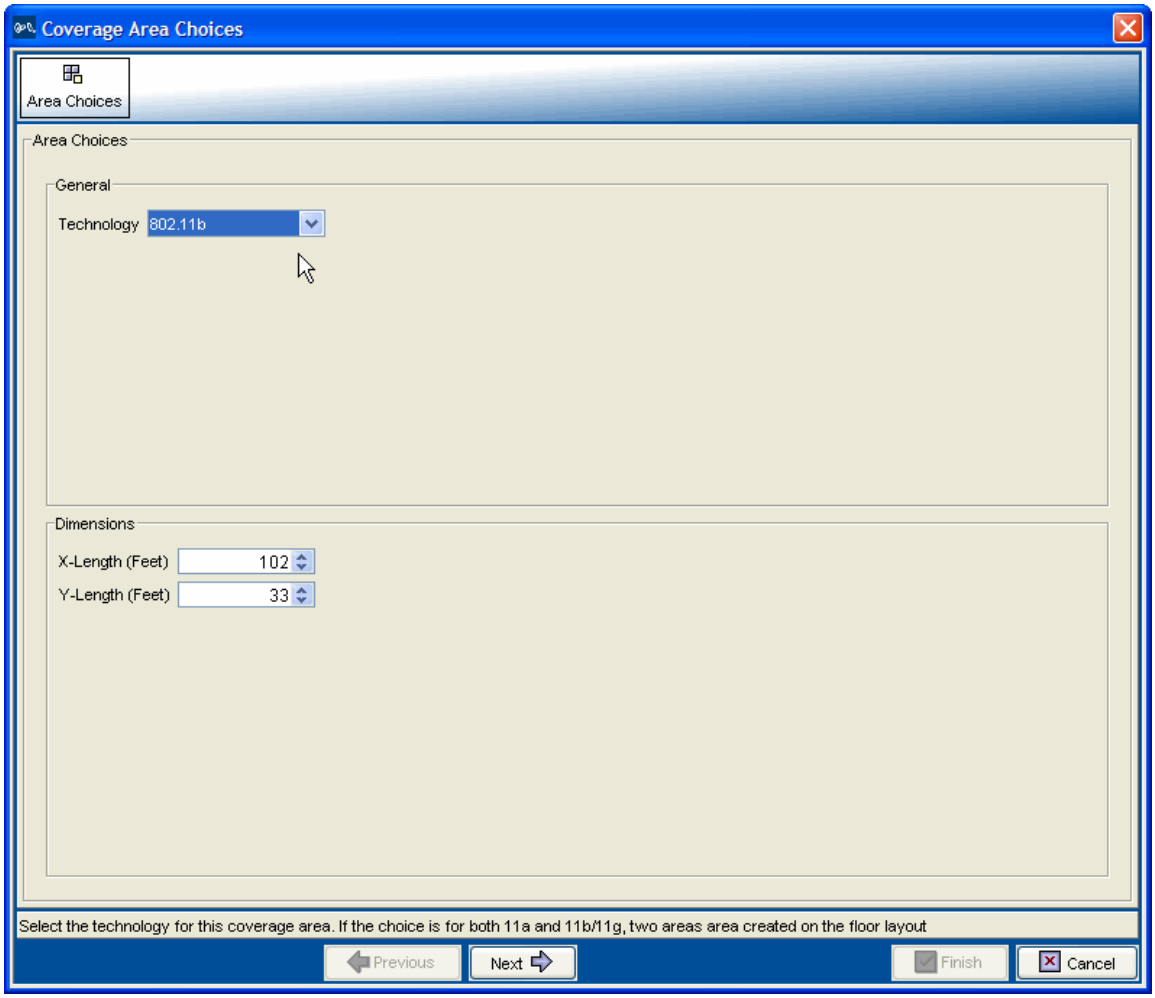

5 Enter a name for the area.

6 Click **Next**.

7 Select your **Mobility Domain, Radio Profile**, and **Service Profile**.

If you do not have a **Service Profile**, click **Create** to create a Service Profile and associate the Service Profile to a Radio Profile. For more information about creating a Service Profile, see "Create a Service Profile" on page 94 and "Create a Radio Profile and Map the Service Profile to It" on page 95.

8 Click **Finish**.

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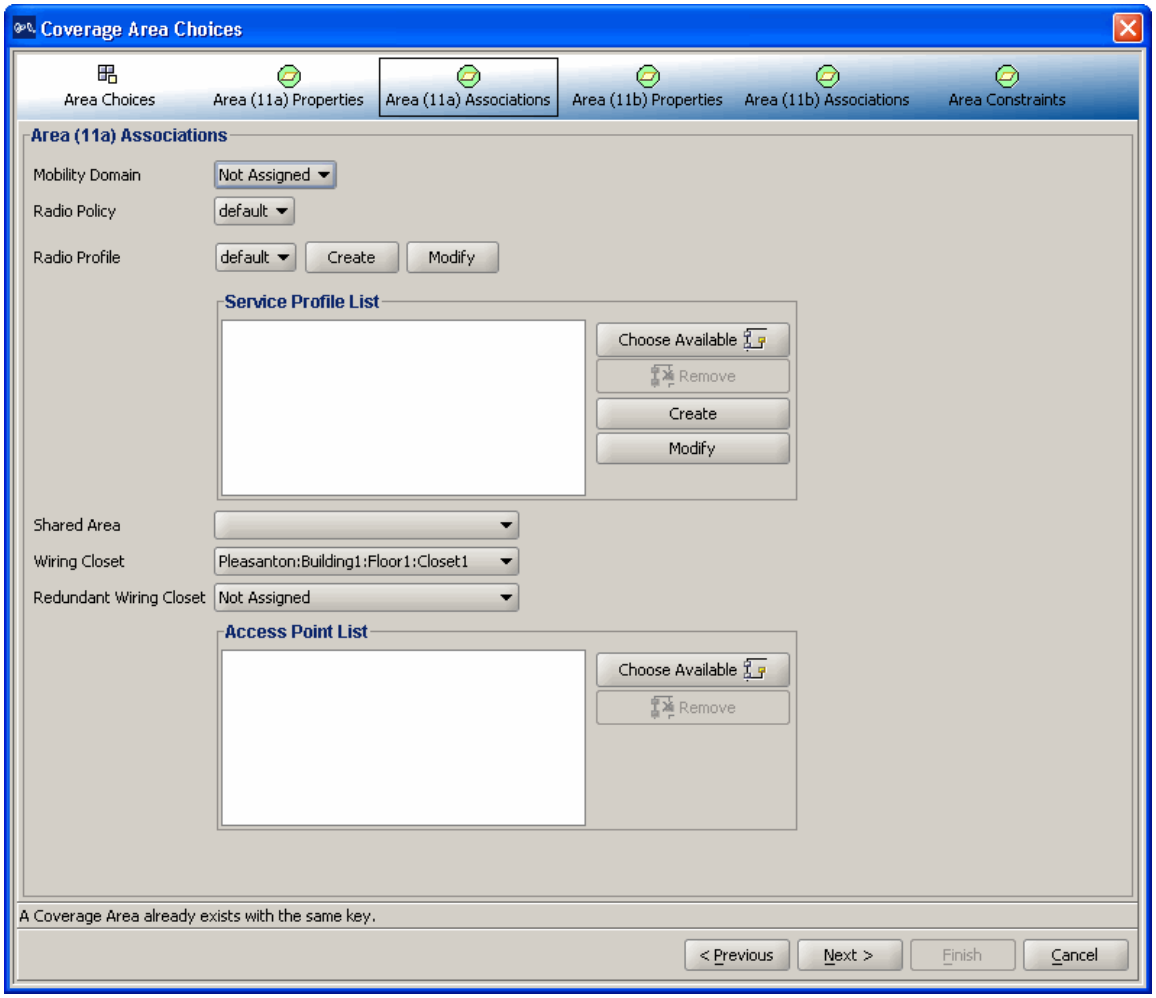

9 The coverage area is now displayed on your floor.

Add MAPs Add your direct MAPs or distributed MAPs to your network.

To add direct MAPs or distributed MAPs to your network:

1 If you have not already done so, create a wiring closet and associate your WX switches to the closet. For more information, see "Create a Wiring Closet" on page 106.

2 Go to "Create Your MAPs" on page 97 for information about adding direct MAPs or distributed MAPs to your network.

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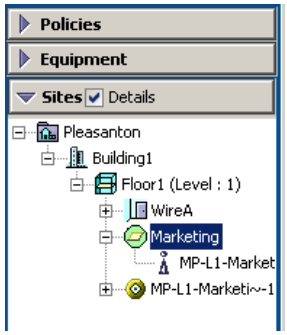
Associate MAPs to the Coverage Area

Associate both your distributed MAPs and direct MAPs to a coverage area on the floor.

To associate MAPs to the coverage area:

1 In the Organizer panel, expand **Sites**. Right-click on the coverage area, and select **Edit**. The Modify Coverage Area is displayed.



2 Select the **Area Associations** tab.

3 Click **Choose Available**.

A list of distributed MAPs and direct MAPs that are members of the WX switches in the selected wiring closet are displayed. Select the MAPs you want to add to the coverage area. Click **Finish**.

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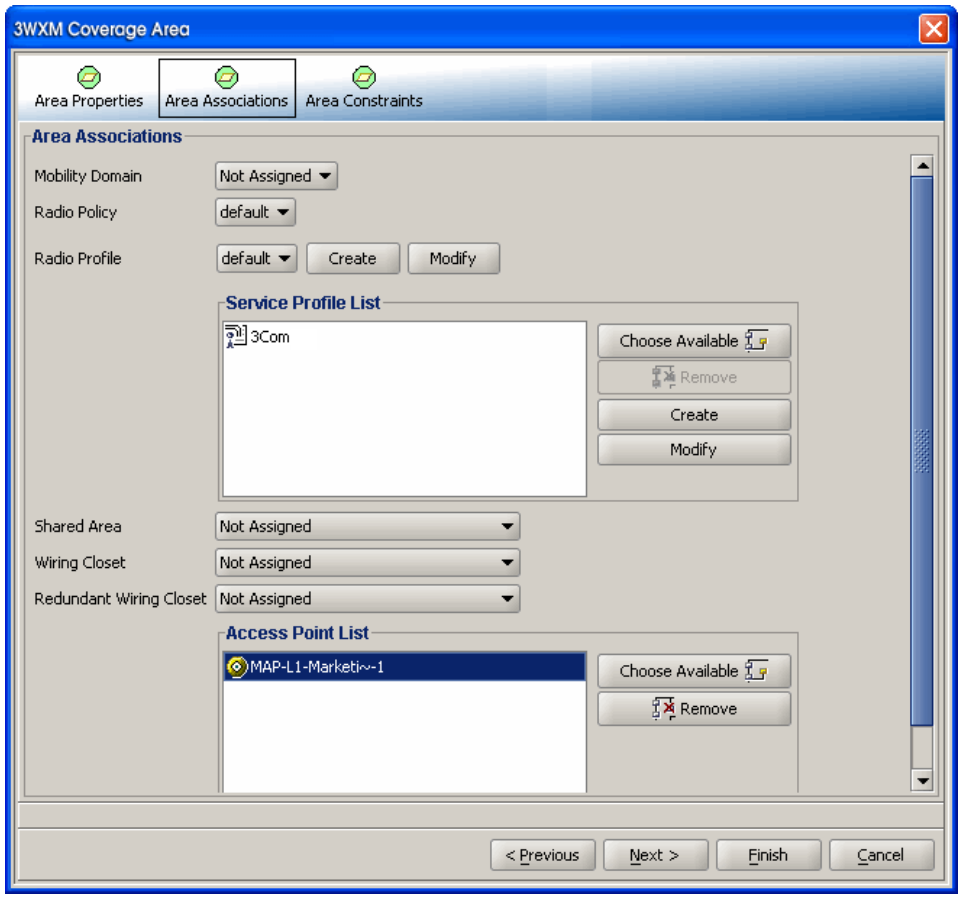

4 In the Sites section of the Organizer panel, right-click on the building and select **Edit**. The Modify Building wizard is displayed. Click on **Plan RF Coverage** at the top of the wizard.

View the MAPs that have been associated to the coverage area.

5 Select the **Object to Place** tab. You can select the MAP to drag and drop it onto any location on the floor plan.

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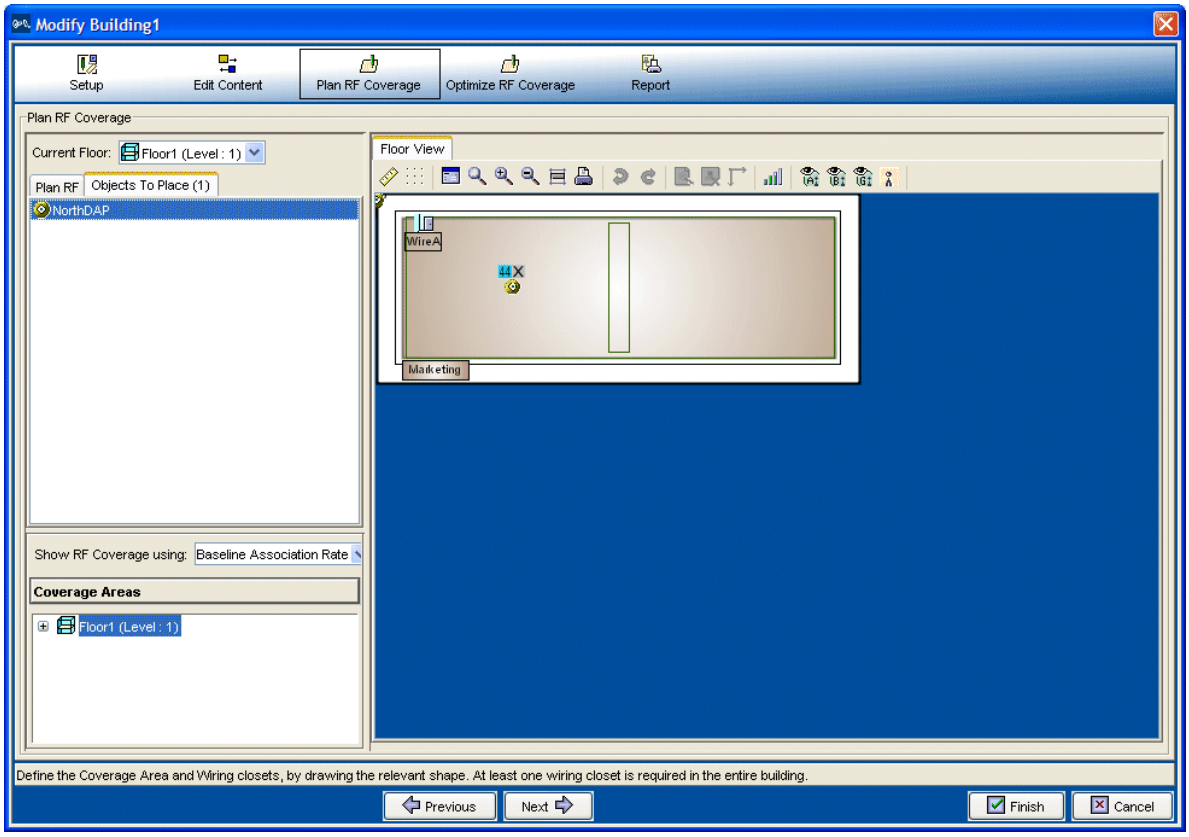

6 The MAP is shown on your floor plan.

What's Next?

This section provides cross references to information on the following tasks:

- "Using RF Planning" on page 113
- "Managing and Monitoring Your Network" on page 143

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6 USING RF PLANNING

Overview

RF Planning is a technique you can use to import detailed information about your site into 3WXM, add RF obstacle information and third-party APs, and configure your RF coverage area at a finer level than is possible using the RF Auto-Tuning with modelling technique.

By defining sites, buildings, and floors, you provide 3WXM with the necessary information to modularly manage large networks based on geographical or organizational boundaries. For example, a network plan can represent a campus-wide network. 3Com recommends that you limit a network plan to a single campus or Mobility Domain. A network plan is also limited to one country, since a network plan only supports one common country code for the WX switches contained in it.

To use the RF planning technique:

- Prepare your floor plan graphic files
- Add site information
- Add RF obstacles
- Add an RF coverage area
- Create a work order
- Install your equipment
- Deploy your configuration

To learn more about the benefits of RF Planning, see "RF Planning" on page 33.

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Prepare the Floor Drawings

If your floor drawings are contained in JPEG or GIF files, this step does not apply. Go directly to "Define Site Information" on page 115.

If you plan to import AutoCAD DXF™ or AutoCAD DWG files into 3WXM, you should perform some "clean up" work before importing the files. Doing this work before you import the files into 3WXM creates a more compact file, requiring less storage space. Typically, the more CAD diagram cleanup that is done within the CAD software, the more smoothly the drawing will import into 3WXM.

To clean up the AutoCAD file:

- Perform an audit
- Turn on, unlock, and unfreeze all layers
- Remove unnecessary notations
- Purge unused blocks, line types, and layers

Typically, based on the drawing technique chosen when the drawing file was created in AutoCAD or TurboCAD, a single object may be drawn with more than one line; for example, walls. When such an object is imported, it results in more than one object in 3WXM. To avoid the actual object being defined as more than one obstacle, delete parallel lines within a certain distance.

Another method you can use to achieve the same result is to group all the lines into one object. For example, you might group four lines that form an office or conference room to create one attenuation factor for that entire area. Or, group multiple lines that were drawn in the floor plan to create a bigger line.

Grouping lines is not always recommended. For example, grouping lines into one object does not work well with polylines. Grouped polylines are recognized by the planning tool in 3WXM as a single, monolithic obstacle. This causes incorrect results when viewing RF coverage.

Objects must not be RF Obstacles or Groups before Clean Layout is performed.

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After you import the file into 3WXM, you have the opportunity to remove any unnecessary objects overlooked during your initial preparation of the floor drawings. To do this, you can use the Clean Layout feature and other editing tools in the Building wizard.

For more information about how to prepare the AutoCAD files for 3WXM, refer to the *Wireless LAN Switch Manager Reference Manual*.

Define Site Information

You define your site with information about your campus, buildings, and floors. In addition, you describe the attenuation characteristics of the location and specify the traffic engineering needs (bandwidth and reliability) of the users.

*3WXM commits your work into the network plan only when you click **Finish**, not when you click **Next**. Changes are not persistently saved until you save the network plan.*

To create a network plan:

1. Connect to a host running 3WXM Services. When you start 3WXM, the 3WXM main window and the 3WXM Services Connection dialog box appear.
2. In the 3WXM Services Connection dialog box, enter the IP address of a host running 3WXM Services, optionally enter a user name and password, and click **Next**.

   If the 3WXM Service is installed on the same machine as the one you are using to run 3WXM, enter 127.0.0.1 as the IP address. This is a standard IP loopback address.
3. After a connection is established to the specified 3WXM Services host, select **File > New**. The Create Network Plan wizard appears.

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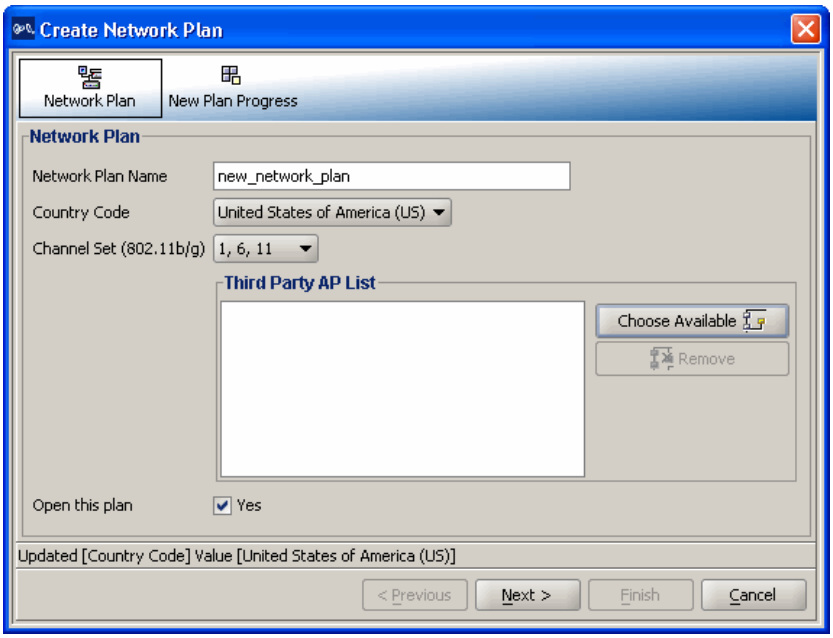

4 In the Network Plan Name box, type a name for the network plan. You can use 1 to 60 alphanumeric characters, with no spaces, tabs, or any of the following: slash (/), backslash (\), quotation marks (" "), asterisk (*), question mark (?), angle brackets (< >), or vertical bar (|).

5 In the Country Code list, select the country where the network is to be deployed.

You must select a country code before continuing.

6 In the Channel Set list, select the set of operating channels for any 802.11b/g MAP radios you plan to use.

The choices in the list are dependent on the country code you chose in step 5. The channel numbers you select are used later in the planning process when you assign channels to 802.11b/g radios.

You might be able to select a set of overlapping channels. However, in some network layouts, using overlapping channels reduces network performance.

Channel numbers used for 802.11a radios do not overlap and are not listed at this stage of the planning process You can modify channel selections for 802.11a and 802.11b/g radios later in the planning process or allow WX switches to set the channels automatically.

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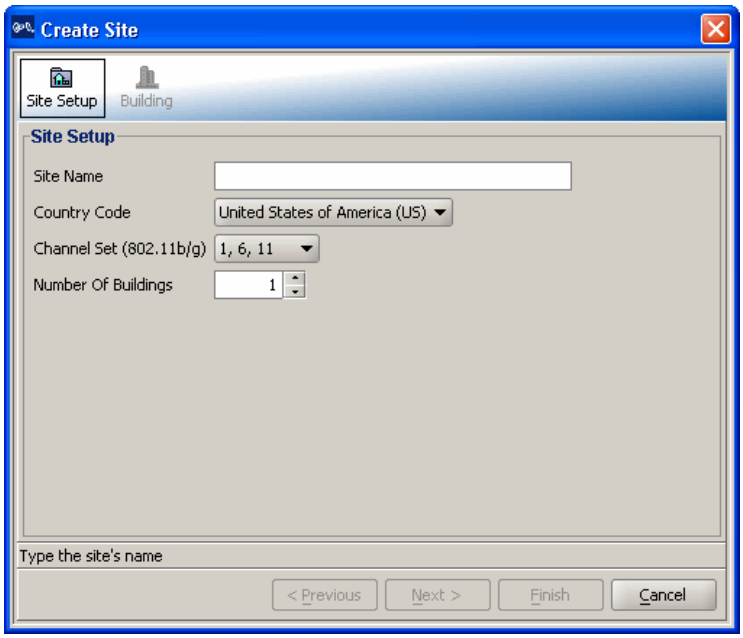
7 If 3WXM detected third-party (non-3COm) APs, they appear in the Third Party AP list. If you want to include any of the listed third-party APs in your network plan, click **Choose Available** and select the APs from the list.

8 Click **Next** to save the network plan on the server and open it in 3WXM.

To add site information:

1 Without selecting any object in the Organizer panel, select **Config > Insert > Site** from the main 3WXM menu. The Create Site wizard appears.



2 In the Site Name box, type a name for the site (1 to 80 alphanumeric characters, with no spaces or tabs).

3 In the Number Of Buildings box, specify how many buildings are in your site.

When you specify the number of buildings a site contains and save the site, 3WXM creates each building using the default settings. You can edit the buildings 3WXM creates or you can add new buildings.

4 Click **Next** to configure building information.

The Building page appears.

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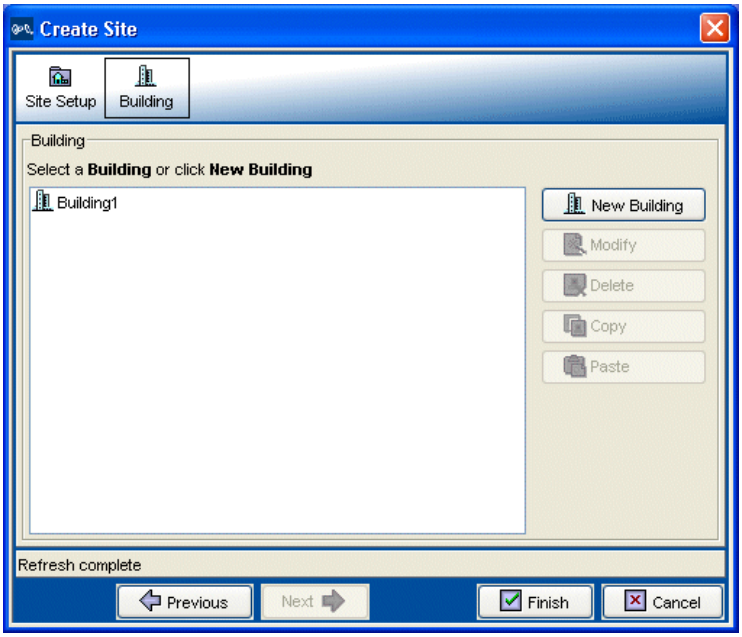

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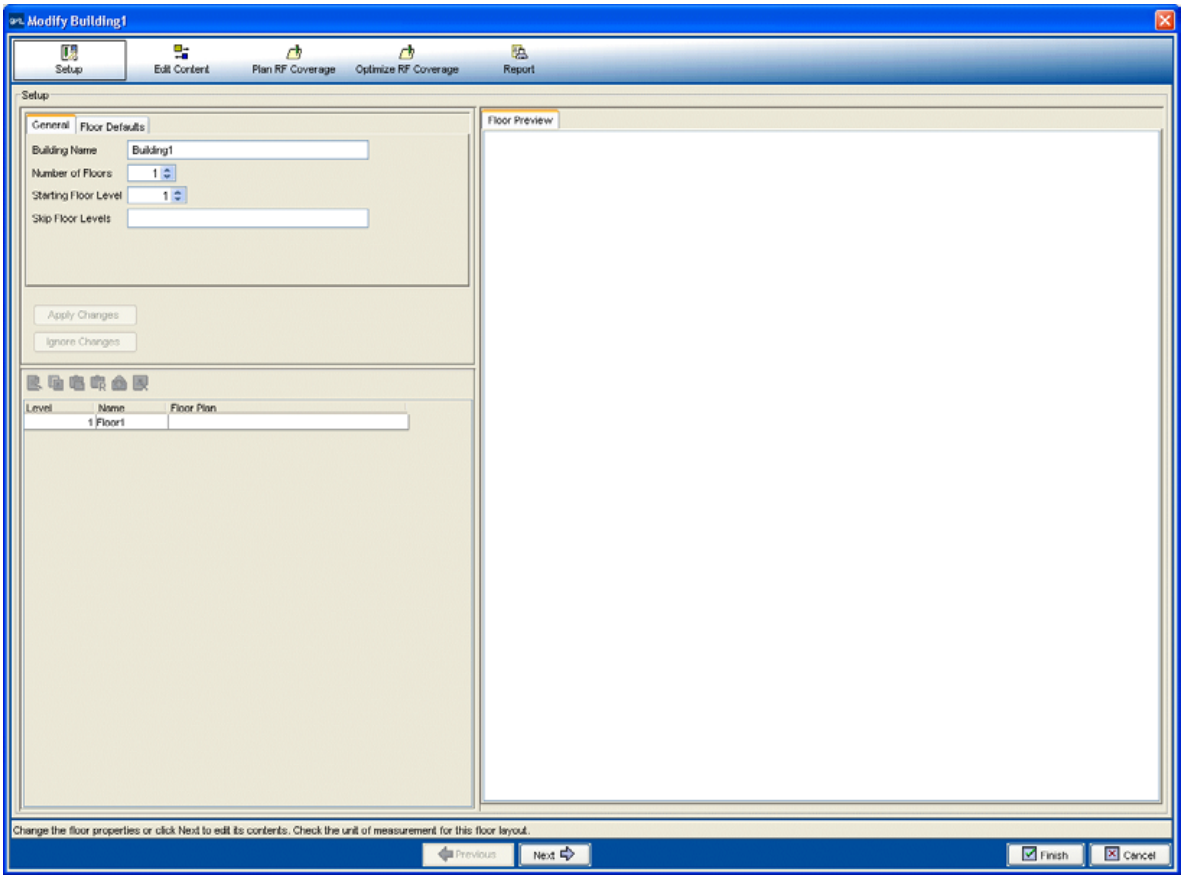
To configure building information:

1 Click **New Building** to add a building to the site. The Create Building wizard appears.



2 In the Building Name box, type the name of the building (1 to 30 alphanumeric characters, with no spaces or tabs).

3 In the Number Of Floors box, specify how many floors the building has.

4 In the Starting Floor Level box, specify the floor number of the first floor in the building. To start with a subterranean floor, you can specify 0 or a negative floor number.

5 In the Skip Floor Levels box, specify floor numbers you want to skip. Skipping floors is useful when you want to model only certain floors in a building. To enter a list of floors, use commas to separate the floor numbers (example: 1,3,7). To enter a range, use a hyphen (example: 8-12).

6 Click **Apply Changes** to apply the numbering changes to the plan.

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7 Select the Floor Defaults tab to modify floor defaults, such as ceiling height, ceiling type (ceiling building material), unit of measurement, and ceiling attenuation. Click **Apply Changes**.

- The default attenuation for ceilings is 10 dB for 802.11b/g and 802.11a.
- The ceiling height is based on the surface of the ceiling where the access points will be mounted, not on the center of the plenum space between floors.

8 Click **Next**.

The Edit Content page is displayed.

9 Define a floor by importing a floor plan or, if the floor plan is not complete, by placing objects manually.

For more information about importing a floor plan, see "Import a Floor Plan" on page 120.

Import a Floor Plan

Import existing floor plans into 3WXM. The file can be in one of the AutoCAD DXF, AutoCAD DWG, JPEG, or GIF formats.

3Com recommends that you modify the AutoCAD files from AutoCAD to remove unnecessary objects and layers; then save them in .dxf format. For more information about how to modify AutoCAD files, see "Prepare the Floor Drawings" on page 114.

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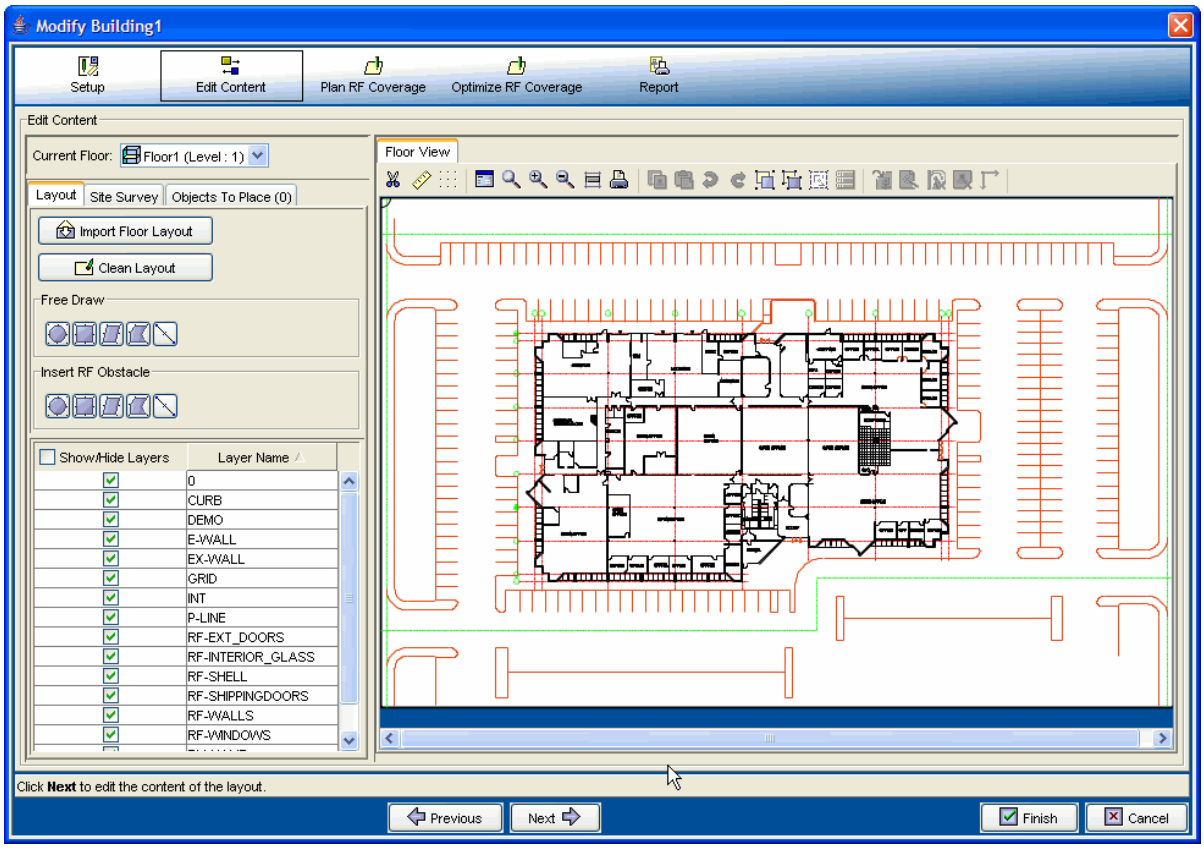
To import a floor plan:

1 Click the **Import Floor Layout** button on the Layout tab. Browse to the file you wish to import. The floor plan is imported.



Set the Scale

Set the scale on your floor plan to better define the distance between objects in your network.

To set the scale:

1 The Organizer panel is displayed on the left. Expand **Sites**, right-click on a building, and select **Edit**.

The Modify Building wizard is displayed.

2 Click the Ruler icon above the floor plan.

a Draw a line on the floor plan over an object whose length you know; for example, a 3-foot door.

b Enter the actual length of the object in the pop-up box.

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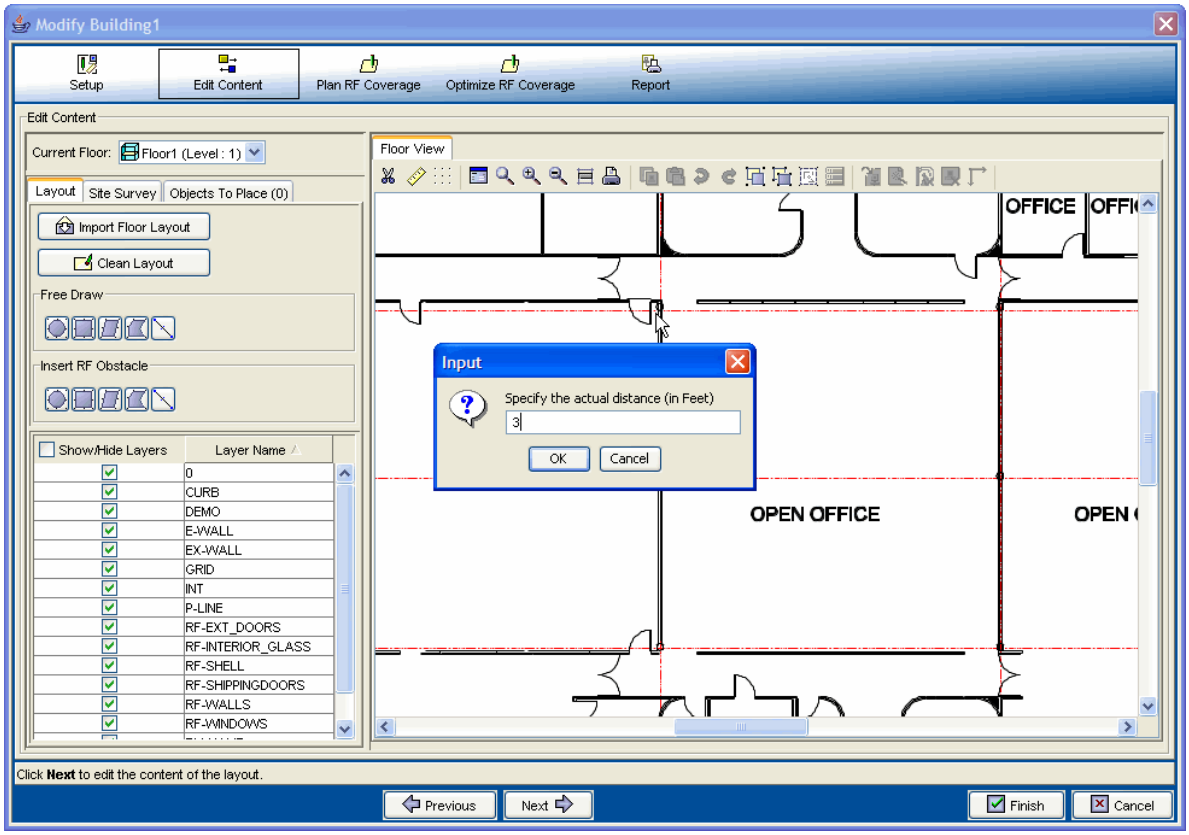
c Click **OK**.



You may want to zoom in the object to be used to define the scale to make this task easier.

Clean Layout

Clean up your floor drawings further if unnecessary objects still remain after your initial floor drawing cleanup.

For more information about cleaning up your floor plans, see "Prepare the Floor Drawings" on page 114.

To clean the floor drawings:

1 The Organizer panel is displayed on the left. Expand **Sites**, right-click on a building, and select **Edit**.

The Modify Building wizard is displayed.

2 On the Edit Content page, click **Clean Layout** to clean up the imported floor plan.

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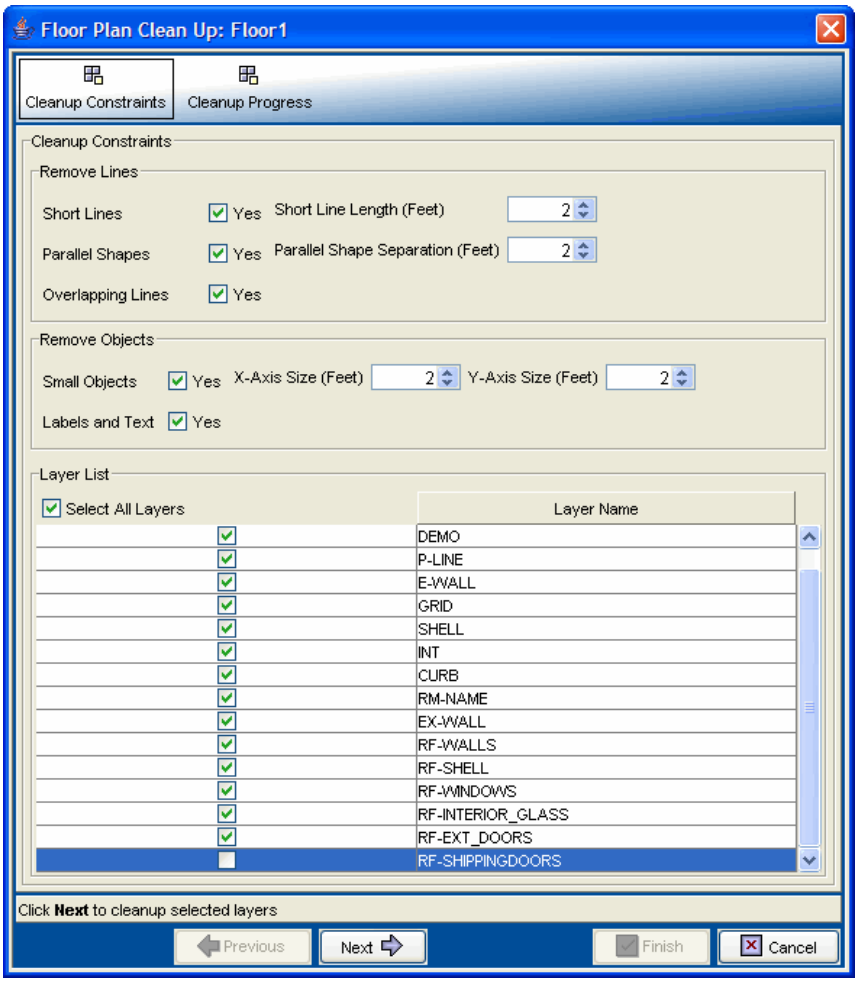
Select the items you would like to remove from the floor plan. Select the layers you want to affect.



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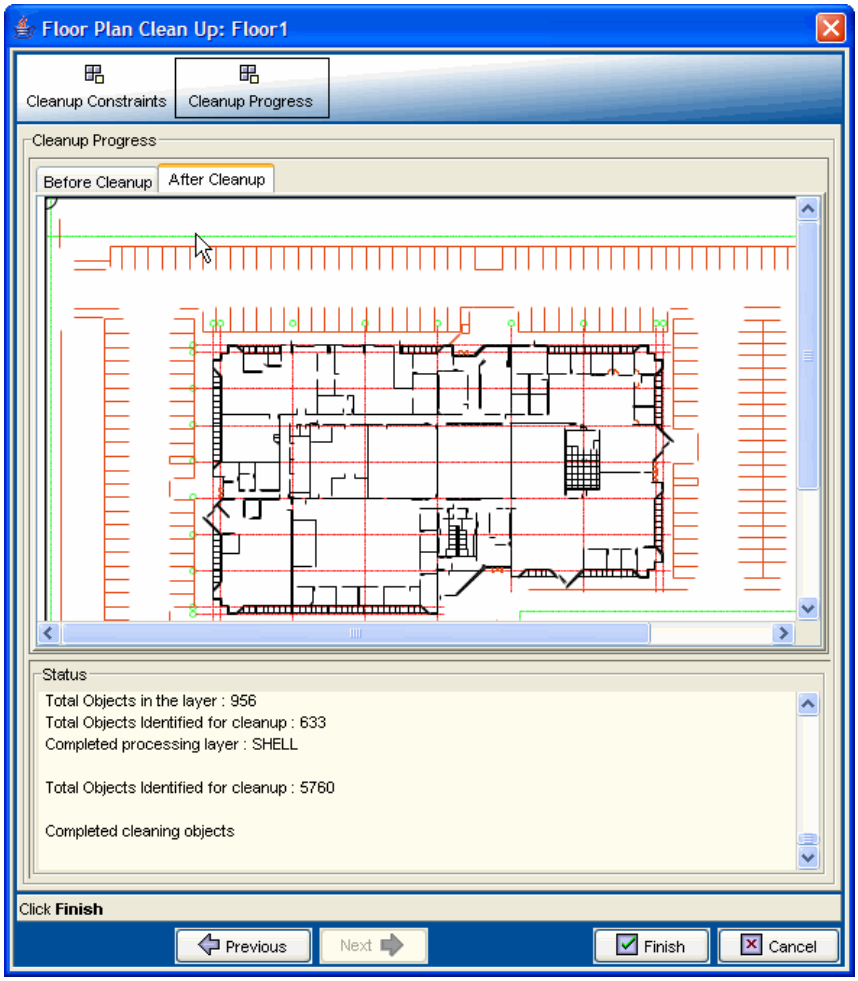
3 Click **Next**.

Cleanup progress is displayed at the bottom of the wizard.

4 You can display a Before Cleanup and After Cleanup view when cleanup is complete.



5 When you are satisfied with the results, click **Finish**.

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Model RF Obstacles

When planning a 3Com network, you need to consider how the building layout and physical objects affect signal loss. Walls, windows, and doors absorb RF signals, and different building materials have different attenuation factors.

You can model an RF obstacle on your floor plan and assign the obstacle type and attenuation factor, or you can assign an obstacle type and attenuation factor to objects in a DWG or DXF drawing. 3WXM uses these values when calculating coverage for the network.

If you do not have an imported drawing, or if you are working with a GIF or JPEG image, you must create RF obstacles manually. If you are using an imported CAD drawing, you can convert many of the objects in the drawing into RF obstacles. All objects similar in construction material should be placed in one layer. For example, if the drawing file has walls spread out in different layers, but after performing a site-survey, they walls were found to be similar in material construction, it is better to put them in one layer. In this way, the RF attenuation assignment can be performed in one step.

This section show how to select and draw objects and convert them into RF obstacles. 3WXM preserves the layers defined in a CAD drawing.

Table 13 provides some common AutoCAD layer terminology.

Table 13 Common AutoCAD Layer Terminology

AutoCAD Layer Name	Commonly Represents...
glaz	windows
scol	steel columns
p-fixt	bathroom
p-part	bathroom stall partitions
ext	exterior
int	interior

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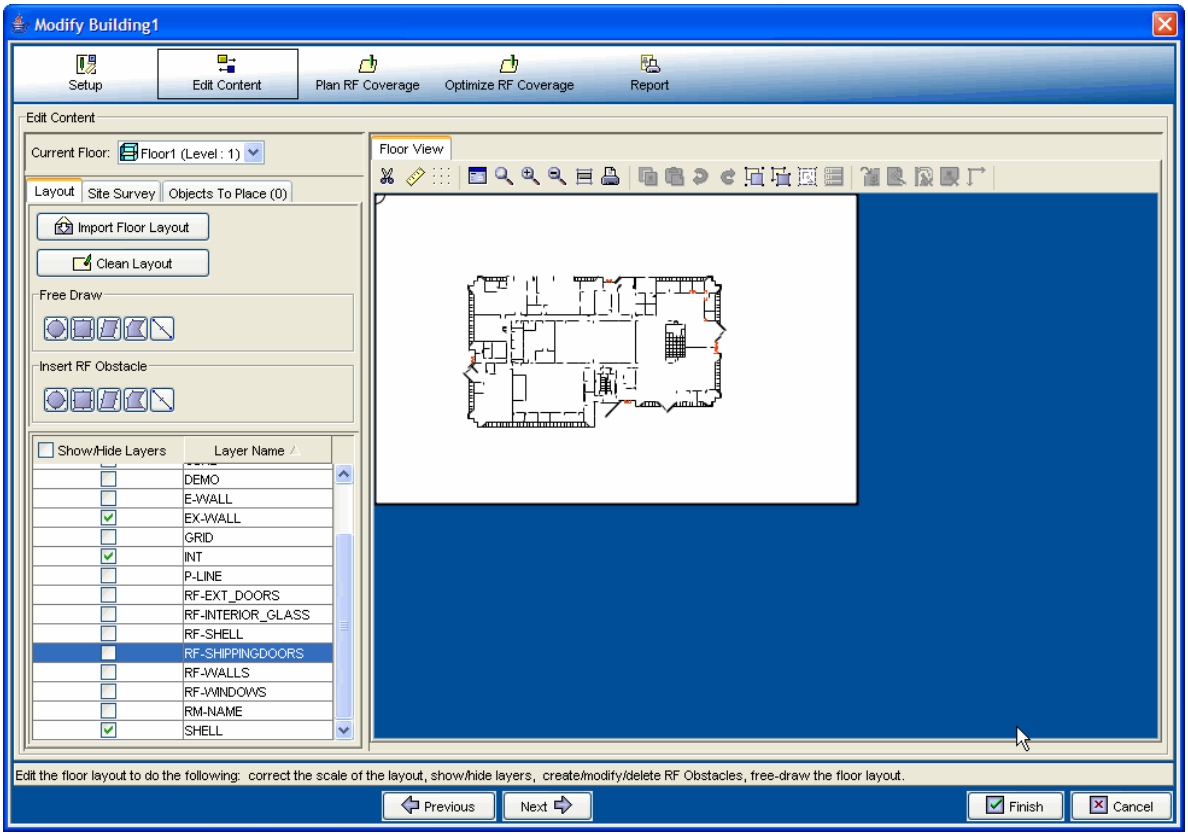
To create RF obstacles for all objects in a layer:

1 The Organizer panel is displayed on the left. Expand **Sites**, right-click on a building, and select **Edit**.

The Modify Building wizard is displayed.

2 Select the **Edit Content** tab.



3 Right-click on a layer and select **Create RF Obstacle**. Mouse over to the floor plan and draw the shape approximately.

4 Define the RF obstacle.

5 Click **Finish**.

The layer's objects are now obstacles in your floor plan.

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Import a Site Survey

You can import RF measurement data by means of a site survey done outside of 3WXM. Using the Site Survey Order report from 3WXM, a map is created of your site that can be used in an Ekahau site survey. After the survey is complete, the measurement data can be imported back into 3WXM, and RF obstacles adjusted. In this way, actual, measured information about RF obstacles can be obtained and incorporated into your plan.

This guide contains post-deployment information about optimization on "Displaying the RF Coverage Area" on page 181. For pre-deployment information about optimization, see "Optimizing a Network Plan" in the *Wireless LAN Switch Manager Reference Manual.*

Plan RF Coverage

How you plan the RF coverage for your network depends on whether you are planning for the widest coverage or are planning for capacity. There are other contributing factors. One group of users may be mobile and require high throughput performance (a higher bandwidth), while another group of users are more stationary and require less throughput.

Select the **RF Coverage** tab in the Create Building wizard to define your coverage area. This section contains the following coverage tasks:

- "Add Wiring Closets" on page 127
- "Create Coverage Areas" on page 129
- "Compute and Place MAPs" on page 134
- "Assign Channel Settings" on page 136
- "Calculate Optimal Power" on page 138
- "Display Coverage" on page 139

Add Wiring Closets

A wiring closet is a container for switches. You need to add at least one wiring closet location to the floor plan. Also consider if you are installing direct MAPs. Direct MAPs (access points directly connected to the WX) should be connected to the WX with UTP Cat 5 cabling. The cable length between the MAP and the WX in the wiring closet can not exceed 100 meters (330 feet).

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To add a wiring closet:

1 The Organizer panel is displayed on the left. Expand **Sites**, right-click on a building, and select **Edit**.

The Modify Building wizard is displayed.

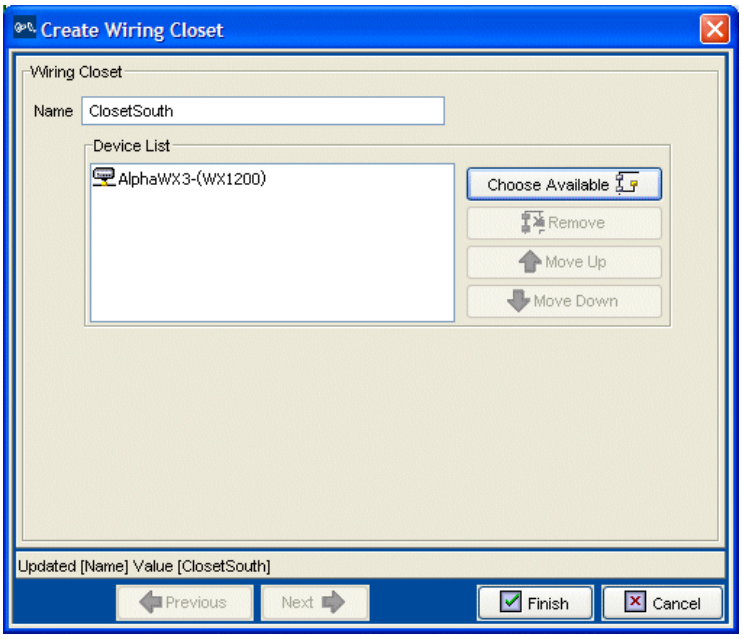
2 Click the **Plan RF Coverage** tab; then click the Door icon under **Wiring Closet/Miscellaneous**.

The cursor in the floor view turns into a crosshair.

3 Mouse over and click on the floorplan to mark the location of the wiring closet.

The Create Wiring Closet wizard is displayed.

4 Click **Choose Available** and select an available switch.



5 Click **Finish**.

The wiring closet is displayed on your floor plan.

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Create Coverage Areas

The RF coverage area is the geographical area in your network you define for RF coverage. As you configure the RF coverage area, consider the amount of bandwidth required for the area, as well as the number of users. You define the coverage area graphically on your floor plan using the coverage area drawing tool. Almost all shapes for a coverage area are possible. However, the following restrictions apply:

- A shape where two sides intersect each other is not permitted.
- A shared coverage area where there is a partial intersection is not supported.

3WXM supports the sharing of coverage areas if one area is completely within a larger area. For example, you might want to provide 802.11a and 802.11b coverage in a conference room that is part of a larger coverage area only providing 802.11a coverage. MAP access points are shared only in the overlapped area.

When you draw a coverage area, it aligns to the grid to provide a whole number for width and height of the shape.

To create a coverage area:

1. In the Building wizard, click the **RF Coverage** tab.
2. Under **Insert Area**, select a shape. Click on the floor plan and draw the shape over the coverage area.

   The Coverage Area Choices wizard is displayed.
3. Select your technology choice. Click **Next**.

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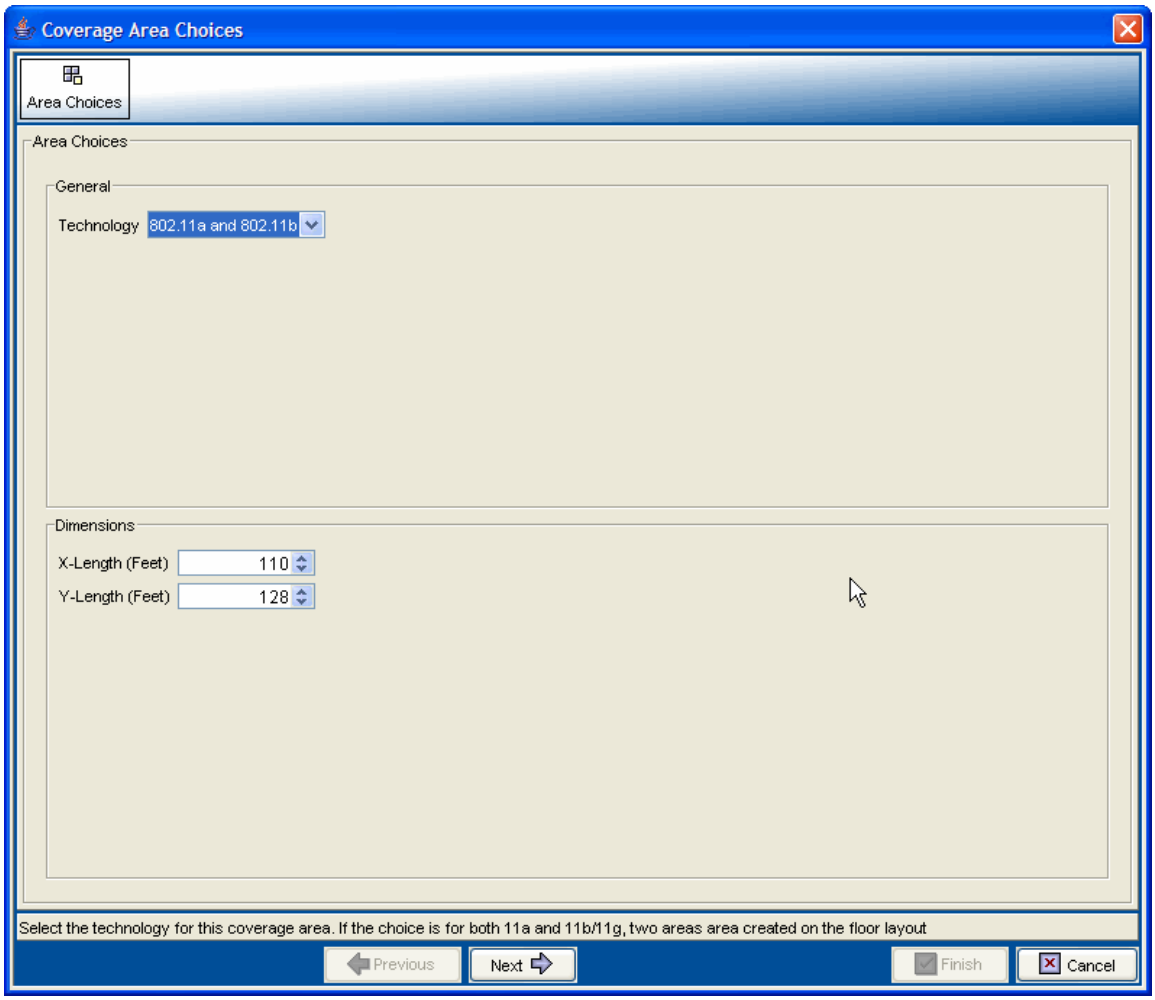

4 Specify the coverage area properties.

- To plan for capacity, check **Capacity**, select the number of users in the **Expected Station Count**, and leave the **Data Rates** baseline at the default.
- To plan for coverage, uncheck **Capacity** (if checked), and set baseline for **Data Rates** to the lowest value.

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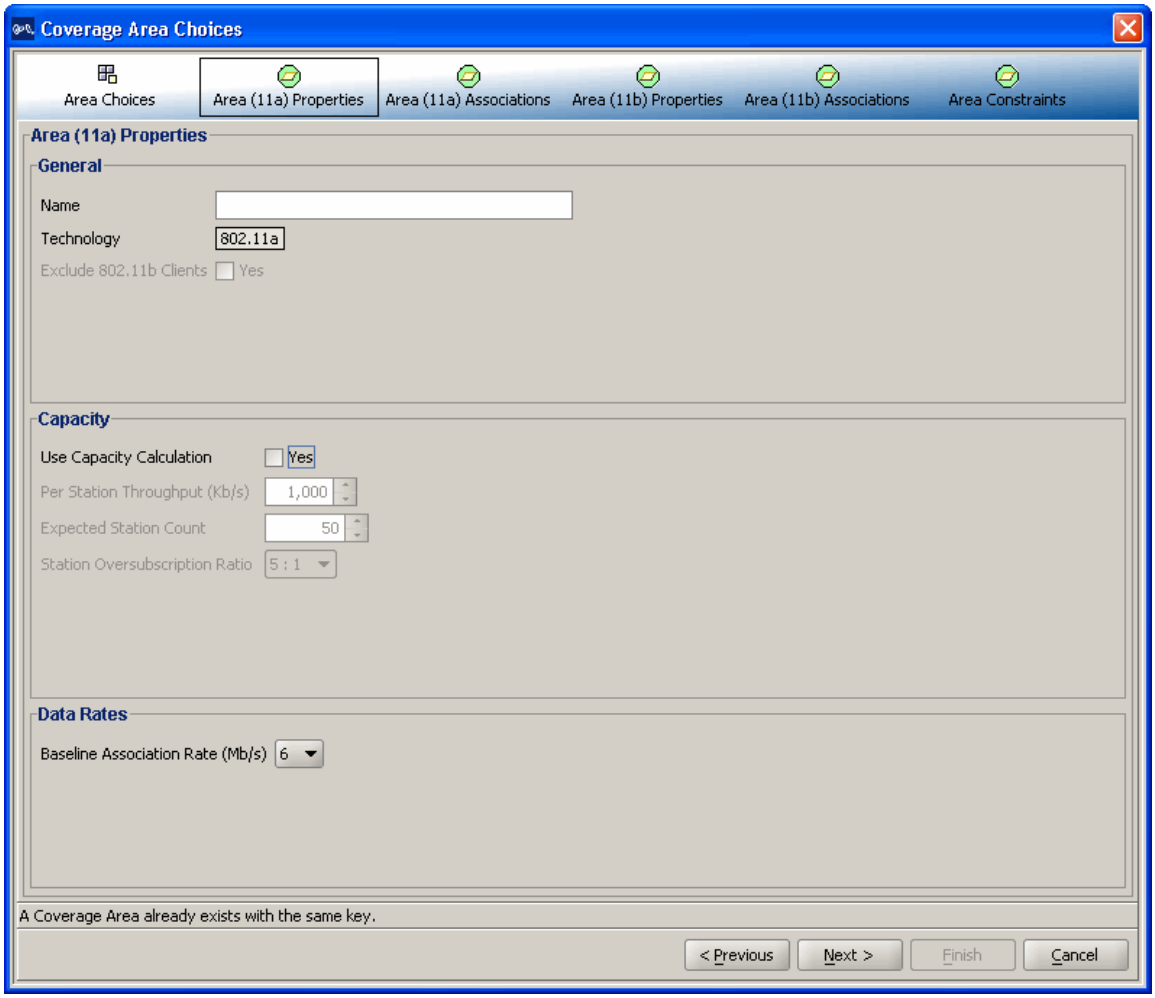

5 Click **Next**.

6 Specify the association information for the coverage area.

- Click **Create** or **Modify** beside **Radio Profile**. Specify a radio profile.
- Click **Choose Available** beside **Service Profile List**. Specify a service profile.

7 Select the primary and backup (optional) wiring closets.

8 Click **Next**.

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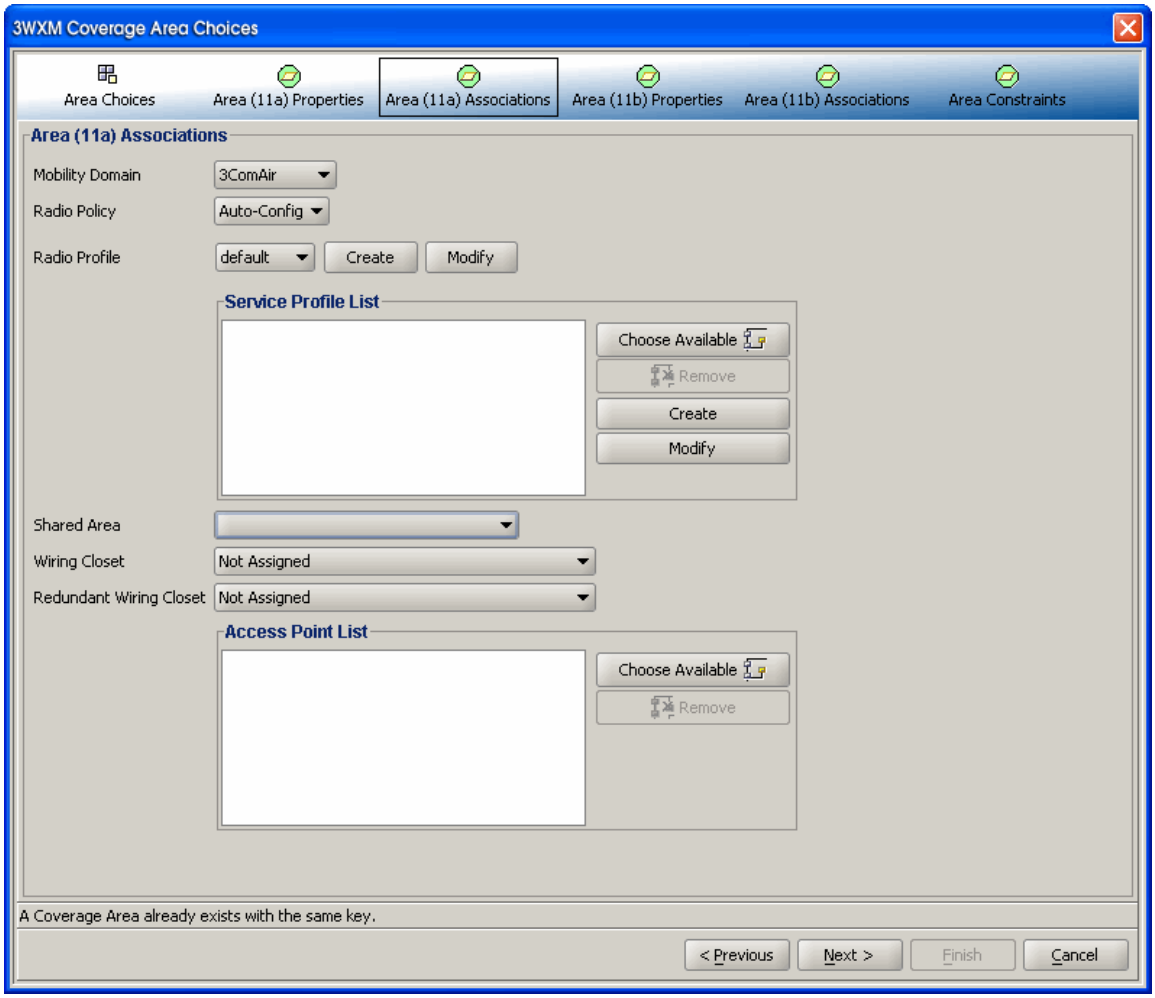

9 Specify additional area constraints.

- Select the **WX Type** and the Default **MAP** to be used in the network.
- Select how the MAPs are connected from the **MAP Connection Type** drop-down list.

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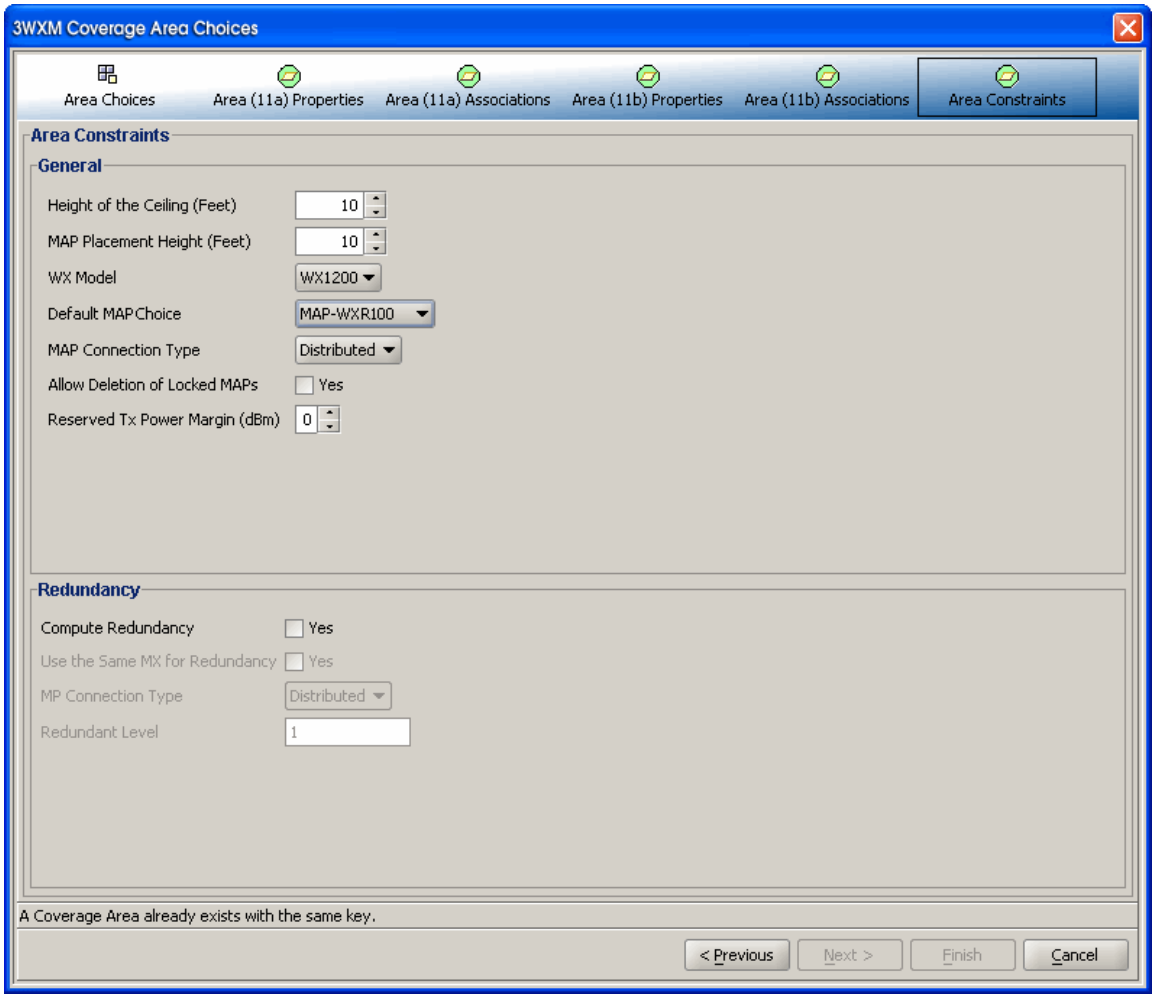

10 Click **Finish**.

The RF coverage area is displayed on the floor plan.

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Compute and Place MAPs

When you perform Compute and Place for one or more coverage areas, 3WXM automatically calculates the number of MAP access points you require and places them in appropriate locations on the floor. To do this, two calculations are performed in 3WXM: One is based on capacity (traffic engineering) and the other is based on pure RF coverage (at a given data rate).

After the calculations are performed, the number of MAPs from capacity and the number of MAPs from coverage are compared, and the bigger count "wins." If capacity wins, a grid pattern of MAPs is established. The MAP coverage positions are reused, with the excess MAPs remaining in their original grid position.

Using a "clean" RF model is imperative for best results. If you have many parallel RF obstacles that are close together, the placement algorithm tends to add more MAPs than are required. So, even with the automatic clean layout mechanism in 3WXM, complex drawings demand additional pruning and isolation of single RF obstacles objects to keep the RF obstacle count as low as possible. For more information about cleaning your floor plans, see "Clean Layout" on page 122.

When you are performing Compute and Place for a coverage area for the first time, the results do not account for existing MAP access points. Manual overrides of the MAP results are not taken into account if you perform Compute and Place again.

To determine the number and placement of MAPs:

1. The Organizer panel is displayed on the left. Expand **Sites**, right-click on a building, and select **Edit**.

   The Modify Building wizard is displayed.

2. Select the **Plan RF Coverage** tab; then click **Compute and Place MAPs**.

3. If required, under **Wiring Closet**, use the down arrow to select the wiring closet associated with the area. Click **Next**.

   The Coverage Area Progress is displayed. Information is shown about the number of MAPs per coverage area, and whether they were placed based on coverage or capacity.

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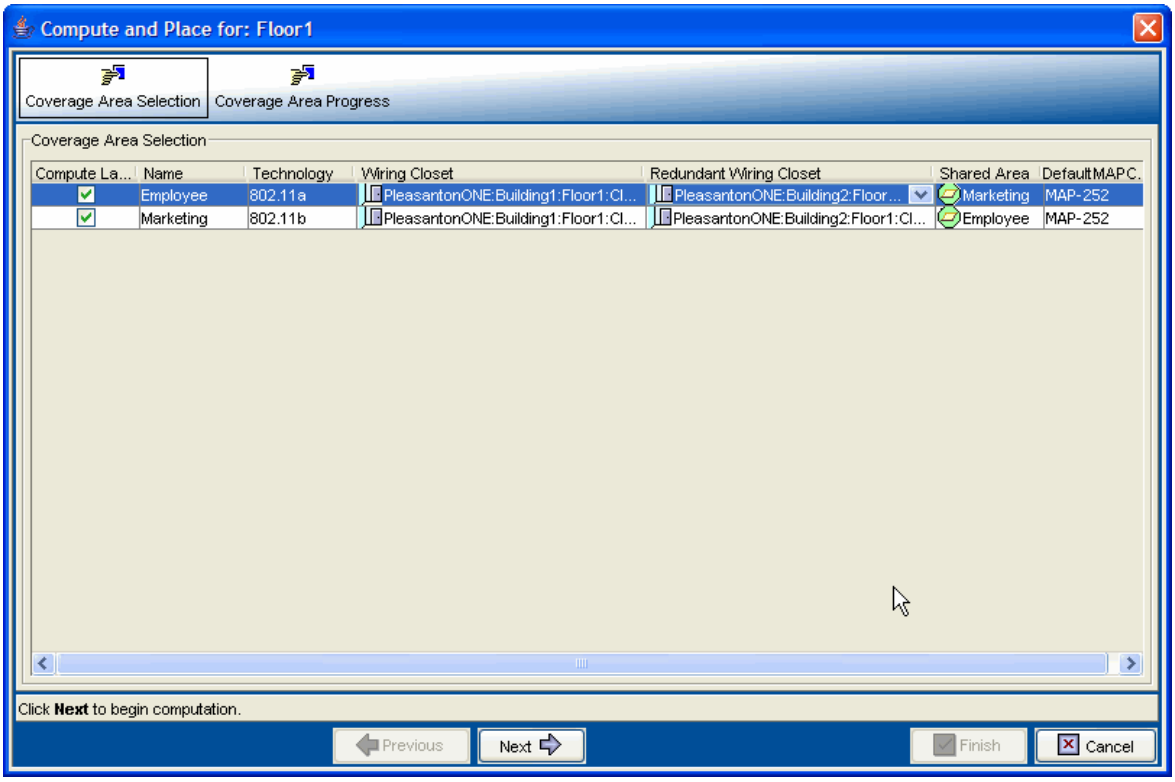
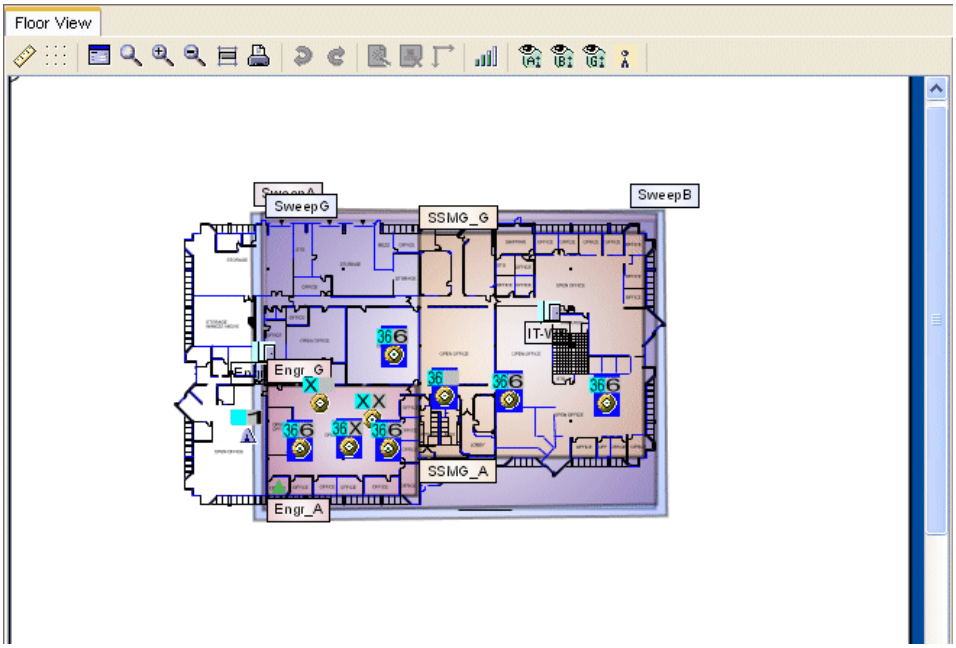


4 The Building wizard displays the location for the MAPs in each coverage area.



5 Click **Next**.

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Assign Channel Settings

After identifying the MAP access points required for a coverage area, you need to assign channels to the MAP access points.

Appropriate assignment of channels across the floor minimizes co-channel interference. The channel assignment algorithm assigns non-overlapping channels to neighboring APs from the selected channel set.

Choose the starting floor and the ending floor (in the downward direction) for multi-floor channel assignment. The algorithm takes predicted RSSI values between neighboring MAPs (including MAPs on different floors and 3rd party APs) and minimizes same-channel assignments between APs. You can specify cross-floor attenuation and the 802.11 technology on which you want to perform the channel assignment. 3WXM uses predicted RSSI values for the imaginary "ray" that is drawn between two MAPs. Consequently, you may see unexpected results if the exact path between the MAPs has many obstacles, but the areas around that path are relatively open. You can make further manual adjustments, if necessary.

To assign channels:

1. The Organizer panel is displayed on the left. Expand **Sites**, right-click on a building, and select **Edit**.

   The Modify Building wizard is displayed.

2. Select the **Plan RF Coverage** tab; then click **Assign Channels to MAPs**.

   The Channel Assignment wizard appears, showing the current channel assignment constraints.

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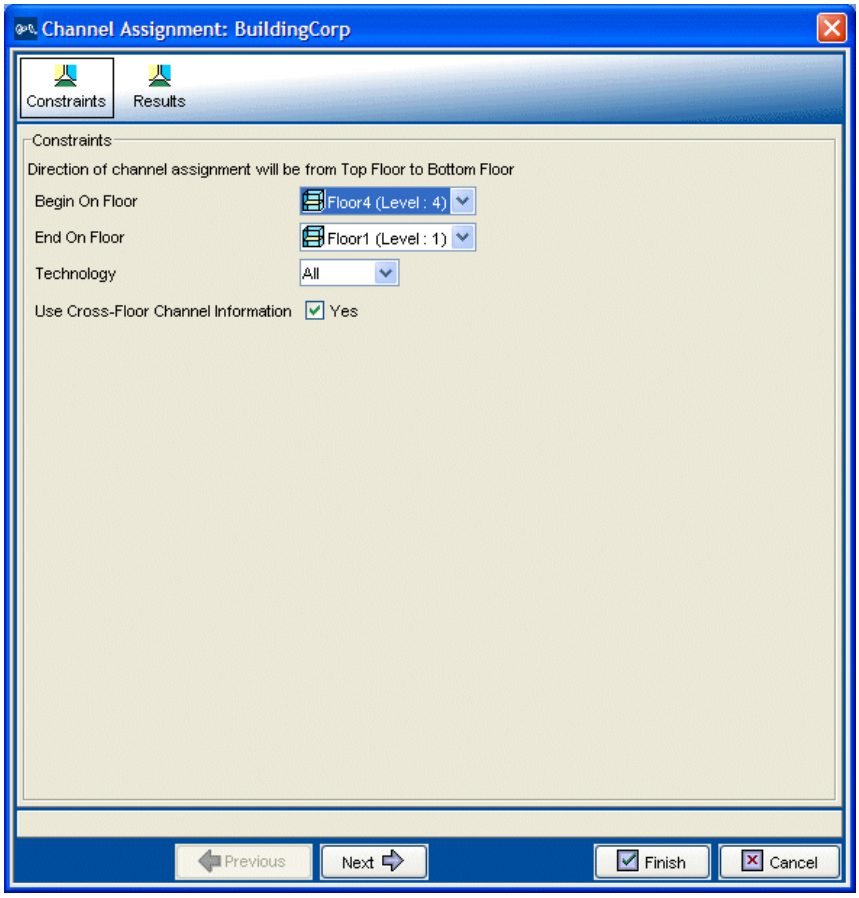

3 To change the starting floor for channel assignment, select the floor from **Begin On Floor**.

By default, 3WXM starts at the top floor and works down.

4 To change the ending floor for channel assignment, select the floor from **End On Floor**.

The ending floor number must be lower than or equal to the starting floor number.

5 Select the radio type from **Technology**.

By default, 3WXM assigns channels for all radio types on the MAP access points placed in the building.

6 To prevent 3WXM from taking the channel assignments for the floor above into account when calculating the channel assignments for a floor, clear **Use Cross-Floor Channel Information**.

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7 Click **Next**.

The Channel Assignment Progress page appears.

8 Review the results. The 802.11a channel assignments are listed on the 802.11a Radio(s) tab. The 802.11b/g channel assignments are listed on the 802.11b/g Radio(s) tab.

9 Click **Finish** to accept the channel assignments.

The new channel assignments are reflected in the Coverage Areas pane.

Calculate Optimal Power

The "Compute and Place" step is performed using the maximum allowed power for the selected channel set in the defined regulatory domain. Optimal power can be computed for each MAP, where transmit power is adjusted (up or down) to provide adequate coverage with minimum RF interference.

When calculating optimal power, you can manually change positions and counts of MAPs (add or remove MAPs) before the final power optimization is performed. Changing MAP quantities and positions is quite typical, given that an operator can interpret the floor plan and understand any cabling constraints to avoid any positioning problems.

Transmit power levels must be high enough to adequately cover an area, but also low enough to minimize co-channel interference. 3WXM factors in these considerations when calculating optimal power.

To calculate optimal power:

1 The Organizer panel is displayed on the left. Expand **Sites**, right-click on a building, and select **Edit**.

The Modify Building wizard is displayed.

2 Select the **Plan RF Coverage** tab; then click **Compute Optimal Power**.

The Compute Power For wizard appears, showing a list of the areas you defined and the corresponding technology.

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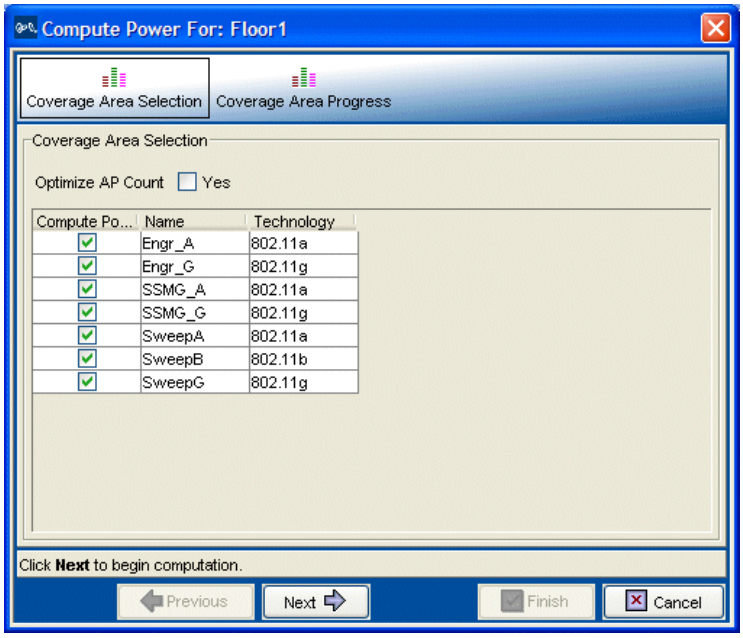

3 You can checkbox **Optimize AP Count**.

Use this option if you moved or added MAP access points on the floor plan after computing and placing them, or if you changed an MAP to model MP-262. This option is disabled by default.

4 Select **Compute Power** for the areas for which you want to compute power.

5 Click **Next**. The Compute Power For Progress page appears. Click **Finish** to see the results.

Display Coverage

Looking at the RF coverage allows you to see if the entire area is adequately covered by the MAP access points. You can move the MAPs and see how the coverage changes.

To display the RF coverage for an area:

1 Beside **Show RF Coverage Using**, select how you want to display the coverage:

- Baseline Association Rate—Coverage is shown based on the MAP radio baseline association rate. The baseline association rate is the typical data rate the radio is expected to support for client associations. (The baseline association rate is specified during planning, on a coverage area basis.)

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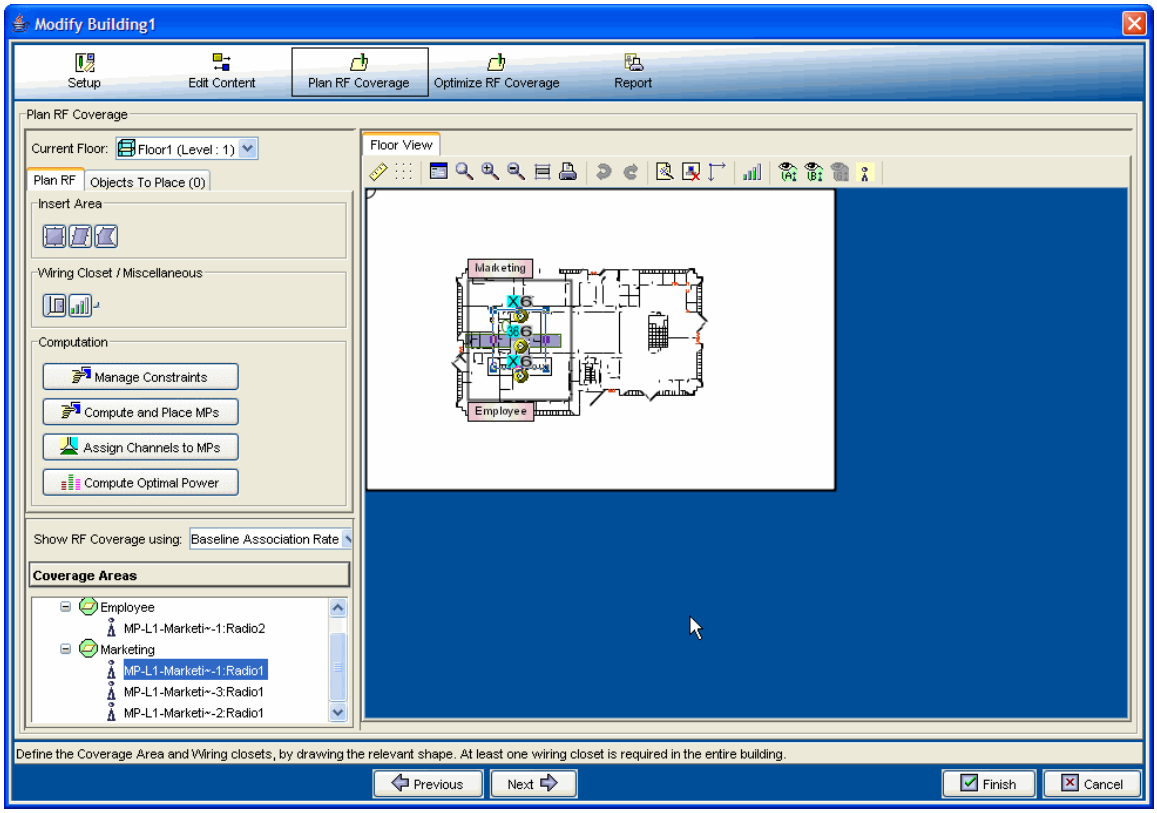
- Data Rate—Coverage is shown in colored bands that represent each of the data transmit rates supported by the radio. These rates are standard for each radio type.
- RSSI—Coverage is shown based on the received signal strength indication (RSSI) of the radio's signal heard by other radios.

2 Right-click on a coverage area and select **Show RF Coverage**.

3 Select the **A**, **B**, or **G** icon from the Floor View toolbar to view the coverage area for that technology.

The coverage area is displayed, color-coded by channel.



If the coverage area provided by an MAP on the floor above or below is one meter or less, 3WXM displays a message. This coverage area is not displayed on the floor plan.

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Generate a Work Order

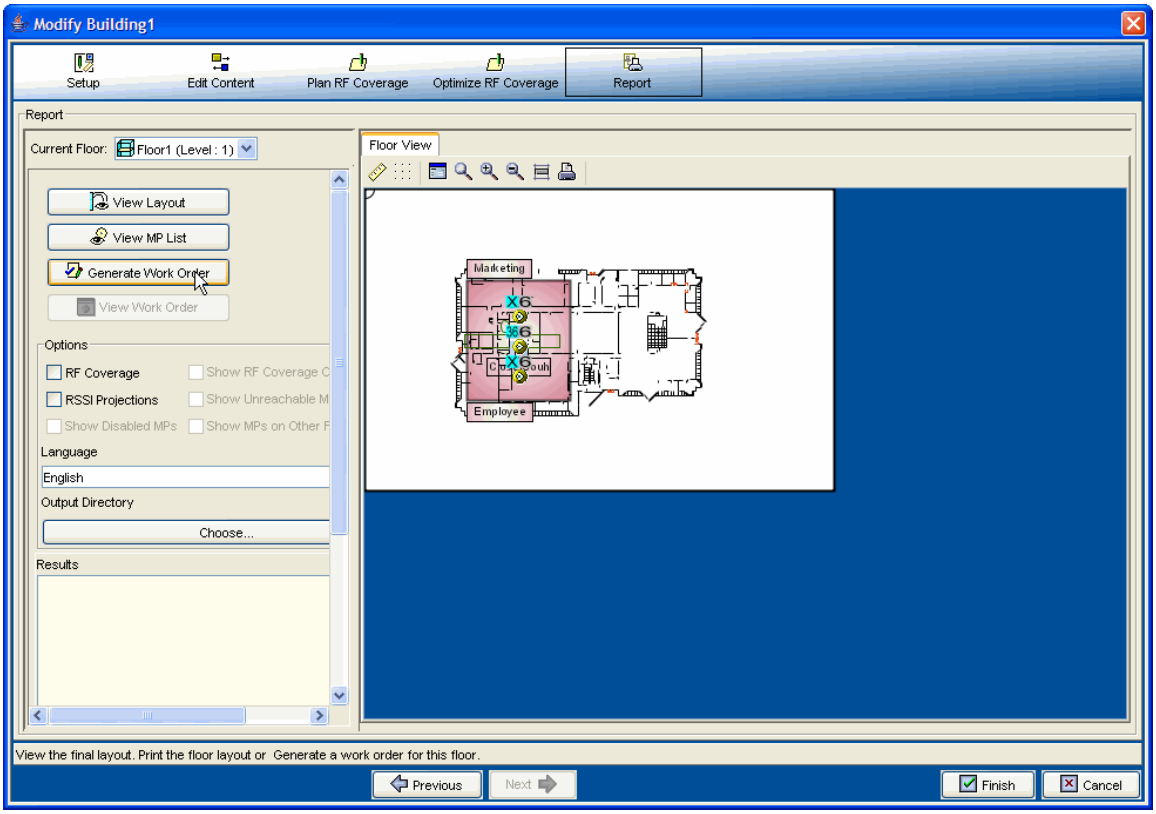
You can generate a work order as part of your wireless network planning. The work order provides all of the necessary information for the physical installation of the 3Com Mobility System. A work order shows where the MAP access points should be installed, WX initial setup configuration information, and projected RSSI information that is useful when verifying the installation.

To generate a work order:

1 The Organizer panel is displayed on the left. Expand **Sites**, right-click on a building, and select **Edit**.

The Modify Building wizard is displayed.

2 Select the **Report** tab.



3 In the **Work Order Options** group box, specify the work order options.

4 In the **Language** list, select English or German.

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5 To select the directory to which the work order report is saved, click **Choose**. The **Select** dialog box appears.

6 Click **Generate Work Order**. The work order is saved in the directory you specified in the format WO_*scope_name_date*. If you generate another order for the same scope on the same day, the old work order is overwritten.

7 After the work order is generated, click the **View Work Order** button.

A browser window opens to display the work order in HTML format.

Install the Equipment

After you print the work order from 3WXM, you can distribute it to your installers. The work order shows where to install the 3Com equipment. If you have specified third-party APs in the network plan, those will be considered in the work order, too.

For more information about installing the equipment, see "Equipment Installation" on page 42.

What's Next?

A 3WXM network plan can support both RF Auto-Tuning and RF Planning techniques at the same time. You can use RF Auto-Tuning to meet the demands of rapid network changes that can be caused by a greater or lesser number of users, or by a physical blockage of MAPs. You are alerted when changes occur in your network of this nature.

- To fine tune your network's RF coverage area and performance, see Chapter 8, "Optimizing a Network Plan," on page 99.
- To deploy your network plan and enable and configure monitoring, see "Managing and Monitoring Your Network" on page 143.

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7 MANAGING AND MONITORING YOUR NETWORK

Overview

This chapter provides information to help you deploy the services you configured for your wireless network, enable communication between a 3WXM client and 3WXM Services, and enable and configure monitoring.

This chapter also provides three monitoring examples you can use as a guide to troubleshooting user connectivity issues in your network, and provides you with information about configuring WX switch management services and performing specific administrative tasks

For an overview of the types of monitoring available in 3WXM, see "Management and Monitoring" on page 44.

For detailed information about monitoring, see the chapter "Monitoring the Network" in the *Wireless LAN Switch Manager Reference Manual.*

For detailed information about performing administrative tasks on an WX switch, see the chapter "Configuring WX System and Administrative Parameters" in the *Wireless LAN Switch Manager Reference Manual.*

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Deploy Your Configuration

Any changes you make to your network in 3WXM are saved when you save the network plan on the server, but the changes are not applied to your network until they are deployed. You see the changes in 3WXM, but the changes are only local to 3WXM.

When you deploy the configuration, you send the configuration from 3WXM to a live WX switch. This method makes it easy to apply a configuration to multiple WX switches, or to deploy changes to a single WX switch.

To deploy the configuration in your network plan to the WX switch:

1. From the 3WXM main menu bar, select **Manage > Deploy**. The Deploy Configurations wizard is displayed.
2. Select the WX switch configuration you want to deploy. Verification is done on the configuration.

*If errors or warnings are identified during verification, a message is displayed at the bottom of the window. After closing the Deploy wizard, click **Configuration** in the Alerts panel. The Config Verification tab is displayed. From there, you can correct errors or specify that 3WXM ignore the errors.*

3. Click **Deploy Now** to deploy the configuration.

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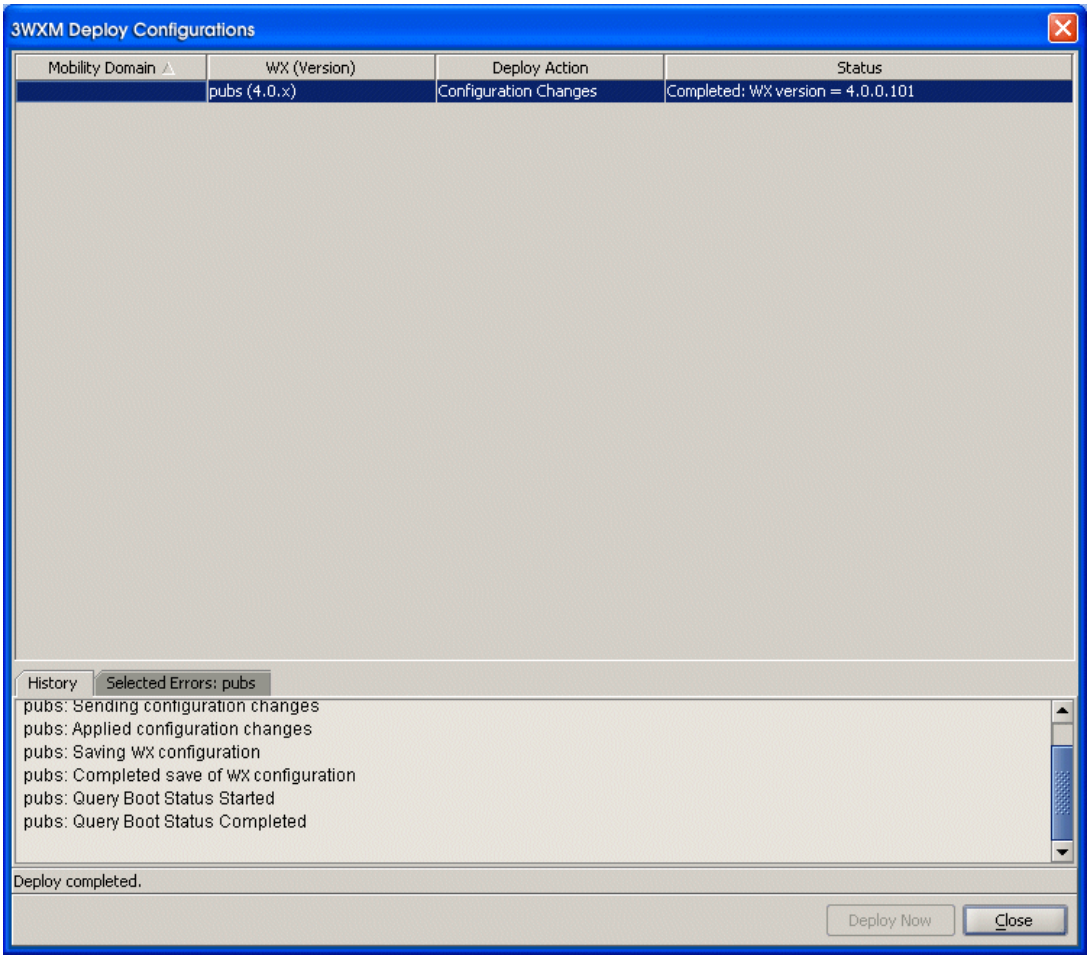

a If you want to confirm that SNMP traps are enabled, expand the WX switch icon in the Organizer panel, right-click on SNMP, then select **Edit**. Click Notification Profile, select the profile, then click **Modify** to display the notification (trap or inform) setting for each notification type in the profile. For simplicity, modify the default profile, and select Enable to enable all notification types. Click **Finish**.

b Click Notification Target. If the IP address of the host where you installed 3WXM Services is not listed as a notification target, click **New Notification Target**. Select target parameters, then click **Finish**. (You might need to click Community or USM User and configure a community string or SNMPv3 user first.)

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To verify your deployment:

1 Select a WX switch from the Organizer panel.

2 Select the **Status Summary** tab. *Up* status (green) confirms a successful deploy.

Perform Basic Administrative Tasks

This section contains information about basic administrative tasks you can perform in 3WXM.

For detailed information about performing administrative tasks including configuring WX switch management services, see the chapter "Configuring WX System and Administrative Parameters" in the *Wireless LAN Switch Manager Reference Manual.*

For more information about image and file management, see the chapter "Managing WX System Images and Configurations" in the *Wireless LAN Switch and Controller Command Reference*.

Configuring WX Management Services

You can configure the following information and management services for the WX switch:

- System information—You can specify system contact information, as well as the CLI prompt and the banner message that appears at each session.
- HTTPS—By default, HTTPS is enabled. TCP port 443 is used for secure access by Web Manager, the 3Com Web-based application for managing a WX switch.

3WXM communications also use HTTPS, but 3WXM is not affected by the HTTPS configuration on the WX. For 3WXM, HTTPS is always enabled and listens to port 8889.

- Telnet—By default, Telnet is disabled. You can enable Telnet for unencrypted access to the CLI. By default, a Telnet user is only provided with read-access to the switch. You must set the service-type attribute to 6 for users who are to be given read and write access to the switch through Telnet.
- SSH—By default, SSH is enabled. You can use SSH for encrypted access to the CLI.
- SNMP—By default, SNMP is disabled. You can configure SNMP community strings and User Security Model (USM) users, notification profiles, and notification targets.

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- Logging—The system log provides event information for monitoring and troubleshooting. You can send the log information to a local data buffer on a WX, to the console, to a Telnet session, and to a configured set of syslog servers.
- Tracing—Tracing allows you to review diagnostic information for debugging MSS. Tracing allows you to review messages about the status of a specific area of MSS.
- Time zone and summertime settings—You can configure the system time and date statically. You also can configure MSS to offset the time by an additional hour for daylight savings time or similar summertime period.

To manage services on a WX switch:

1. Do one of the following:
   - Open the Modify WX Switch wizard, then select System Information under Management Services in the organizer list of the System and Administrative page.
   - In the Organizer panel, right-click on Management Services under a WX switch, then select **Edit**.
2. Select one of the service selections under **Management Services**, modify settings, and click **Finish**.

Distributing Image and Configuration Files

You can update the WX system image and configuration files by using the **Distribute Images & Configuration** dialog box. You can distribute system image and configuration files in the following ways:

- System image files only
- System image and configuration files together
- Configuration files only

When you manage images and configurations this way, 3WXM verifies the configuration and system image compatibility. Compatibility is verified when you deploy a network plan.

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Using the Image Repository

Use the image repository to add or delete WX system images. The image file is checked and its version is verified when added to the image repository. Images are stored in the *3WXM_installation_directory\xm\Images* directory.

To add a system image:

1. Select **Tools > Image Repository**. The Image Repository dialog box appears.
2. Click **Add Image**. The Add to Repository dialog box appears.
3. Navigate to the directory containing the system image.
4. Select the system image.
5. Click **Add to Repository**. The image is added to the image repository and appears in the Image List.
6. To close the Image Repository dialog box, click **Close**.

To delete a system image:

1. In the Image Repository dialog box, select the image you want to delete.
2. Click **Remove Image**. A prompt appears.
3. Click **Yes** to delete the system image.

   Click **No** to cancel the deletion process.
4. To close the Image Repository dialog box, click **Close**.

Distributing System Images

You can distribute a system image to one or more WX switches. Optionally, you can distribute compatible configuration information from the network plan to the WX switches at the same time. To use a new system image, you must reboot the WX switch.

3Com recommends that you verify the network plan and correct any configuration errors before distributing system images. Select **Manage > Verification**.

To distribute a system image:

1. In the main 3WXM window, select **Changes > Distribute Images & Configuration**.

   The Distribute Images & Configuration dialog box appears.

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2. In the Mobility Domain Selection list, select the Mobility Domain of the WX switch or switches you want to distribute images to. If the switches are not in a Mobility Domain, select None.
3. Select a WX or multiple WX switches.

   To select more than one WX, click **Shift** while clicking to select contiguous items, or click **Ctrl** while clicking to select noncontiguous items.
4. To select the system image to be distributed, click **Select Image**.

   The Image File Selection dialog box appears.
5. Select the system image file you want to distribute.
6. Click **Close**.
7. To distribute a configuration file, select **Distribute Config**. If you do not want to distribute a configuration file, uncheck **Distribute Config**.
8. To reboot the selected switch(es) immediately after the images are downloaded, select **Reboot**. If you want to reboot the switches at a more convenient time, such as during a a maintenance window, uncheck **Reboot**.
9. Click **Distribute**.

   The status of the download is shown in the Status column.
10. Click **Close** to close the dialog box.

Distributing WX Configuration Files

You can distribute a complete WX configuration defined in a network plan as a file and download it to one or more WX switches at one time. Using this feature replaces the current configuration file on the WX. You must reboot the WX for the configuration file to take effect.

3Com recommends that you verify the network plan and correct any configuration errors before distributing system images. Select **Manage > Verification**.

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To distribute a WX configuration file:

1. In the main 3WXM window, select **Manage > Distribute Images & Configuration**. The Distribute Images & Configuration dialog box appears.
2. In the Mobility Domain Selection list, select the Mobility Domain of the WX switch or switches to which you want to distribute images. If the switches are not in a Mobility Domain, select None.
3. Select a WX or multiple WX switches. To select multiple items, press **Shift** (for contiguous items) or **Control** (for noncontiguous items) while clicking items.
4. Select **Distribute Config**.
5. Click **Distribute**.

   The status of the download process is shown in the Status column.
6. Click **Close** to close the dialog box.

Saving Versions of Network Plans

You can save multiple versions of a network plan. After deploying a network plan to a WX switch, you can save a snapshot of the plan as a version. Create versions of the network plan on a regular basis and at every major baseline event for network configurations. Doing so allows you to have snapshots of network configurations should you need to revert to one of them.

If you need to roll back configuration changes, you can use a saved version to roll back the system software image and configuration files to a known state. Before you can save a version of a network plan, you need to deploy and save the network plan. Versions of network plans are saved in the db/xml/versions directory in the 3WXM installation directory.

After you have saved a version of a network plan, the version appears in the list of network plans available to open. If you open a version of a network plan, you are asked whether you want to deploy it or open it. When the version is open, you see its version name in the title bar of the main 3WXM window.

To save a version of a network plan:

1. Select **File > Save As**.
2. Type a name for the plan. Make the name descriptive. For example, name the plan *HappyVille_4_0_1*.

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3 Click **Next**. The status of the saving process appears.

4 Click **Finish**.

Saving Network Plans Automatically By default, 3WXM uses the autosave feature to automatically save changes to a network plan at regular intervals while you are working.

To view or modify backup settings, select **Tools > 3WXM Services Backup/Restore**. The Backup/Restore dialog appears.

Importing or Exporting Switch Configuration Files

You can export switch configuration files in CLI or in Extensible Markup Language (XML) format.

- The import option enables you to create a WX switch in the network plan by importing configuration files that were created with the CLI or in Extensible Markup Language (XML) format. You also can update the configuration of a switch that is already in the plan.
- The export option enables you to save a WX switch configuration to a CLI or XML file. Using the CLI, you can transfer a configuration file in CLI format to WX using TFTP. After exporting an WX configuration to an XML file, you can import it to another instance of 3WXM or use it as a backup copy.

If you import a configuration containing information that an older version of 3WXM or MSS does not support, the information is ignored when the configuration is imported.

If you import a switch configuration, you must enable 3WXM management of the switch before you can deploy the switch to the network.

To import a configuration:

1 In the main 3WXM window, select **File > Import**. The Import Configurations dialog box appears.

2 In the Import Into Mobility Domain group box, select one of the following options:

- Click **Use File Info** to import the configuration information using the Mobility Domain specified in the configuration files.
- Click **Select** to specify a Mobility Domain to import configuration information to. Then select the Mobility Domain from the list.

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3 To replace existing WX switch information in 3WXM with information from the configuration file, select **Overwrite Existing WX Switches**.

4 Click **Select Files**. The Select Files To Import dialog box appears.

5 Select one or more configuration files to be imported. To make multiple selections, press **Shift** (for contiguous items) or **Control** (for noncontiguous items) while clicking items.

6 Click **Select Files To Import**. The file or files you selected appear in the File Import Results list.

To remove all the files you previously selected, click **Clear Files**.

7 Click **Import**. The status of the import process appears in the Status column.

8 Click **Close** to save the changes.

9 Enable 3WXM to manage the switch.

a Right-click the WX switch icon in the Organizer panel. Select **Edit**.

The Modify Switch wizard is displayed.

b Select **Managed** and click **Finish**.

c Deploy your configuration (see "Deploy Your Configuration" on page 144).

To export a configuration:

1 Select **File > Export**. The Export Configurations dialog box appears.

2 In the Export From list, select the Mobility Domain whose configuration you want to export.

3 If you want to export the configuration file to a different directory, click the **Choose** button, which is labeled with the current output directory. The Select dialog box appears. Navigate to the directory you want to use as the output directory, and click **Select**.

4 To overwrite previously exported configuration files, select **Overwrite Existing Files**.

If you do not select this option, you cannot export a configuration file with the same name as an existing file in the output directory. You can rename the existing file or move the file to another directory.

5 To have 3WXM create a backup copy of a previous configuration file, select **Copy Files Before Overwriting**.

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6. To include the default configuration commands in the exported file, select **Export Defaults**.
7. Select the format for the exported file: **CLI** (ASCII) or **XML**.
8. For each WX whose configuration you want to export, make sure the **Export** checkbox is selected.
9. Click **Export** to begin the exporting process. Messages appear in the Status column in the WX List box and the Results box.

   The configuration is saved in the directory that you specified.
10. To close the Export Configurations dialog box, click **Close**.

Monitoring Examples

3WXM provides many monitoring options. The section "Management and Monitoring" on page 44 provides an overview of all the monitoring tools available to you.

This section describes how you can use some of the monitoring tools to determine problems that are typically reported to a network operator.

The monitoring examples described in this section are based on the following scenarios:

- An individual user calls the help desk with the complaint that the network is very slow or inaccessible
- A group of users complain about network performance
- You want to monitor and eliminate a rogue AP

Monitor an Individual User

If an individual user notifies you with the complaint that the network is very slow or inaccessible, use the following steps to identify the problem:

1. Find the user. Place the user on a watch list.
2. Locate the user. (If you can locate them, then the scope of the problem can be narrowed down to performance.)
3. View the user's network activity.
4. View statistics over a period of time. Placing the user on the watch list allows 3WXM to gather long-term statistics.

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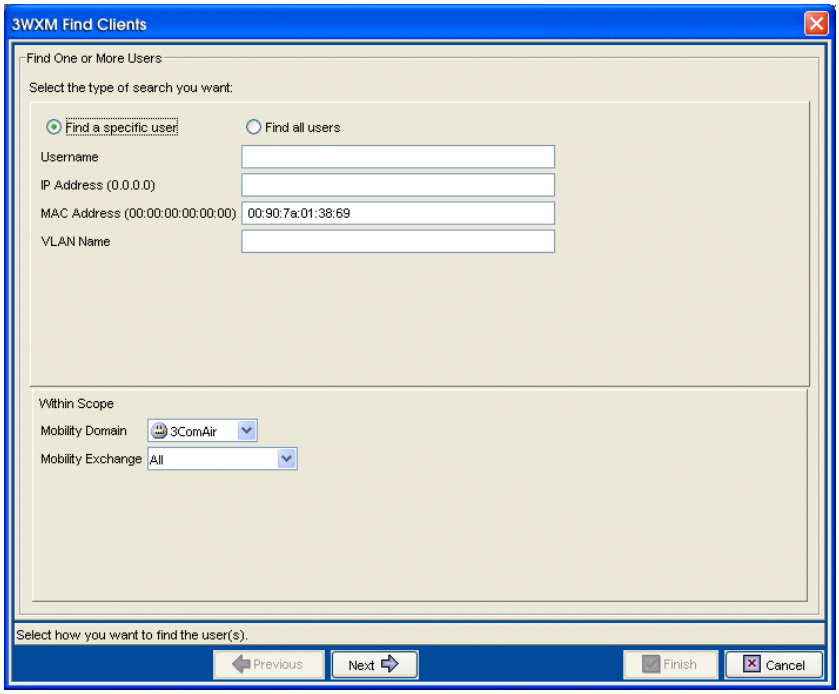
Find the User

You can find a user or multiple users based on the following criteria:

- Username
- MAC address
- IP address
- VLAN name

To find the user:

1. Select **Monitor > New Monitor** from the toolbar in the main 3WXM window.
2. On the Monitor tab, select **Client Monitor** from the **Select a View** drop-down list.
3. Click on the Client Monitor window's toolbar.
4. Enter the type of search you want to perform, and select the scope for the search.
5. Click **Next**.



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Place User on Watch List

If viewing the user's current activity does not conclusively indicate the source of the problem, you can place the user on a watch list. Statistics polled for a watch list are gathered over time—up to 30 days. In this way, a pattern of events or statistics may be revealed, indicating the cause of the problem.

To place a user on a watch list:

1. Click the **Client Sessions** tab in the Client Monitor window.
2. Select the client, then click on the Client Monitor window's toolbar.

   You can view the user's history for up to 30 days.

Locate the User

You can display the user's location by doing the following:

1. Select the WX switch icon in the Equipment section of the Organizer panel.
2. Select **Monitor > New Monitor** from the toolbar in the main 3WXM window.
3. On the Monitor tab, select **Client Monitor** from the **Select a View** drop-down list.
4. Select the **Client Sessions** tab.
5. Select the user; then click on the Client Monitor window's toolbar.

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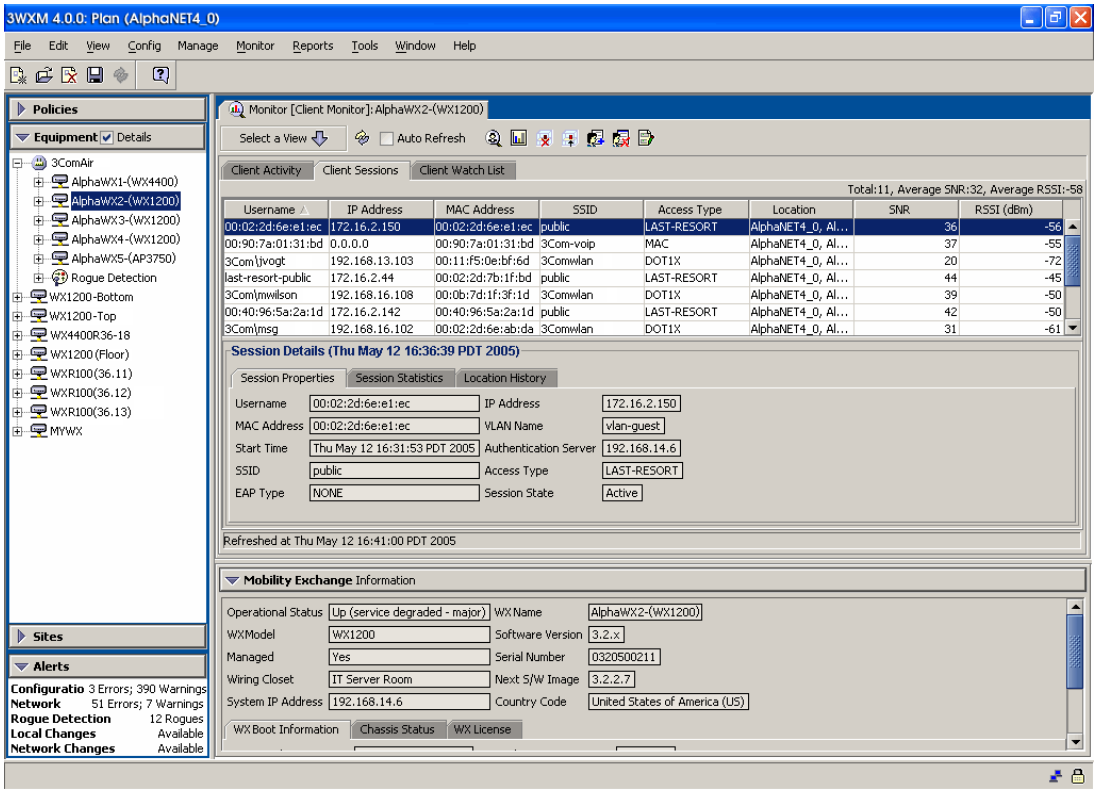

6 The user's location is shown as a contour on the floor plan. The user is somewhere on that contour line.

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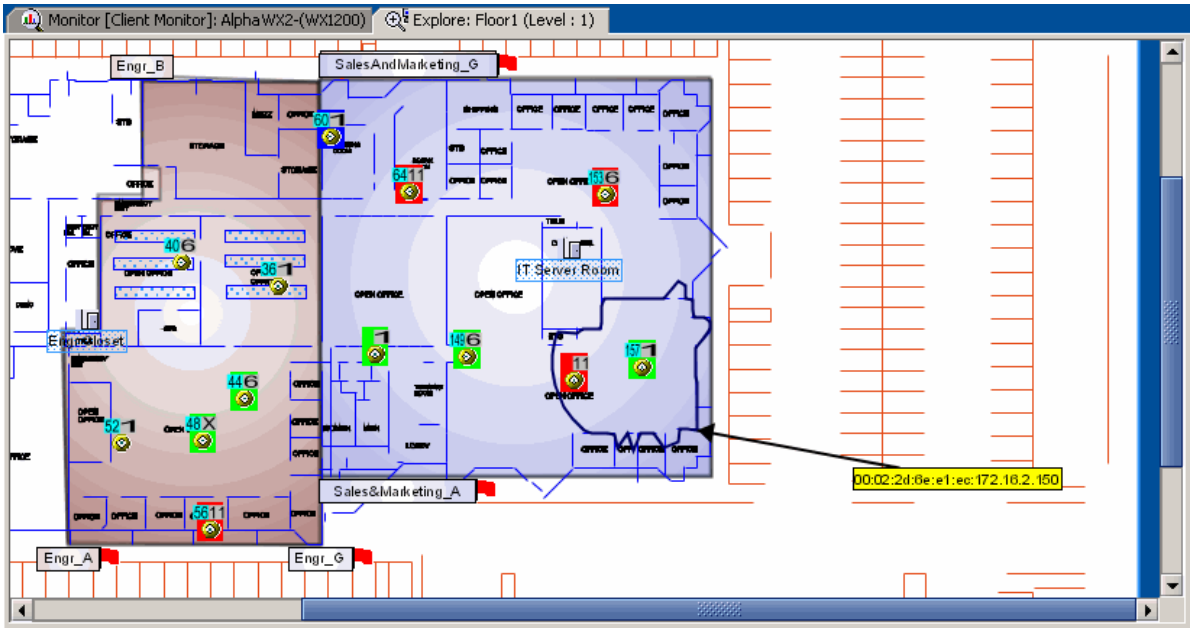

Display User Activity

You can display the event types displayed for the user. Disassociation events can occur, and users dropped from the network. These events can indicate the reason why access is barred or performance slow for the user. For example, typical authorization failures occur if the local database or RADIUS server fails to recognize a user.

To display user activity:

1. On the Monitor tab, select **Client Monitor** from the **Select a View** drop-down list.
2. Click on the **Client Sessions** tab and select a user.
3. Select the **Location History** tab to see where the user has been. From here, you can determine the areas in the WLAN where interference is occurring.

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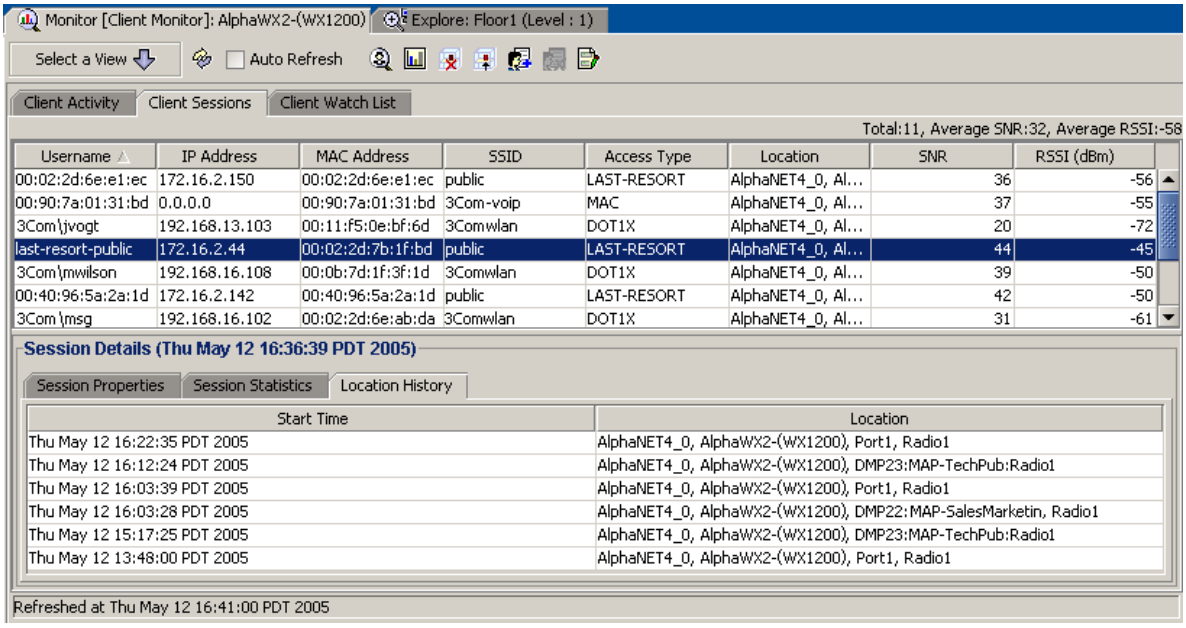
Monitor [Client Monitor]: AlphaWX2-(WX1200)
Explore: Floor1 (Level : 1)
Select a View
Auto Refresh
Client Activity
Client Sessions
Client Watch List
Total:11, Average SNR:32, Average RSSI:-58
Username
IP Address
MAC Address
SSID
Access Type
Location
SNR
RSSI (dBm)
00:02:2d:6e:e1:ec 172.16.2.150 00:02:2d:6e:e1:ec public LAST-RESORT AlphaNET4_0, Al... 36 -56
00:90:7a:01:31:bd 0.0.0.0 00:90:7a:01:31:bd 3Com-voip MAC AlphaNET4_0, Al... 37 -55
3Com\jvogt 192.168.13.103 00:11:f5:0e:bf:6d 3Comwlan DOT1X AlphaNET4_0, Al... 20 -72
last-resort-public 172.16.2.44 00:02:2d:7b:1f:bd public LAST-RESORT AlphaNET4_0, Al... 44 -45
3Com\mwilson 192.168.16.108 00:0b:7d:1f:3f:1d 3Comwlan DOT1X AlphaNET4_0, Al... 39 -50
00:40:96:5a:2a:1d 172.16.2.142 00:40:96:5a:2a:1d public LAST-RESORT AlphaNET4_0, Al... 42 -50
3Com\msg 192.168.16.102 00:02:2d:6e:ab:da 3Comwlan DOT1X AlphaNET4_0, Al... 31 -61
Session Details (Thu May 12 16:36:39 PDT 2005)
Session Properties
Session Statistics
Location History
Start Time
Location
Thu May 12 16:22:35 PDT 2005 AlphaNET4_0, AlphaWX2-(WX1200), Port1, Radio1
Thu May 12 16:12:24 PDT 2005 AlphaNET4_0, AlphaWX2-(WX1200), DMP23:MAP-TechPub:Radio1
Thu May 12 16:03:39 PDT 2005 AlphaNET4_0, AlphaWX2-(WX1200), Port1, Radio1
Thu May 12 16:03:28 PDT 2005 AlphaNET4_0, AlphaWX2-(WX1200), DMP22:MAP-SalesMarketin, Radio1
Thu May 12 15:17:25 PDT 2005 AlphaNET4_0, AlphaWX2-(WX1200), DMP23:MAP-TechPub:Radio1
Thu May 12 13:48:00 PDT 2005 AlphaNET4_0, AlphaWX2-(WX1200), Port1, Radio1
Refreshed at Thu May 12 16:41:00 PDT 2005

View Long-Term User Statistics

If the user's complaint cannot be traced to a specific problem using current statistics, you can view user activity for the next 30 days.

To view long-term user statistics:

1 Click on the Client Watch List tab and select the user.

2 In the Client Details section of the window, select **Trend: Lifetime MAP Stats** to graph the watch list user's activity over all MAPs.

Using this data, you can determine whether the user's problem is interference due to low bandwidth (Unicast Bytes in).

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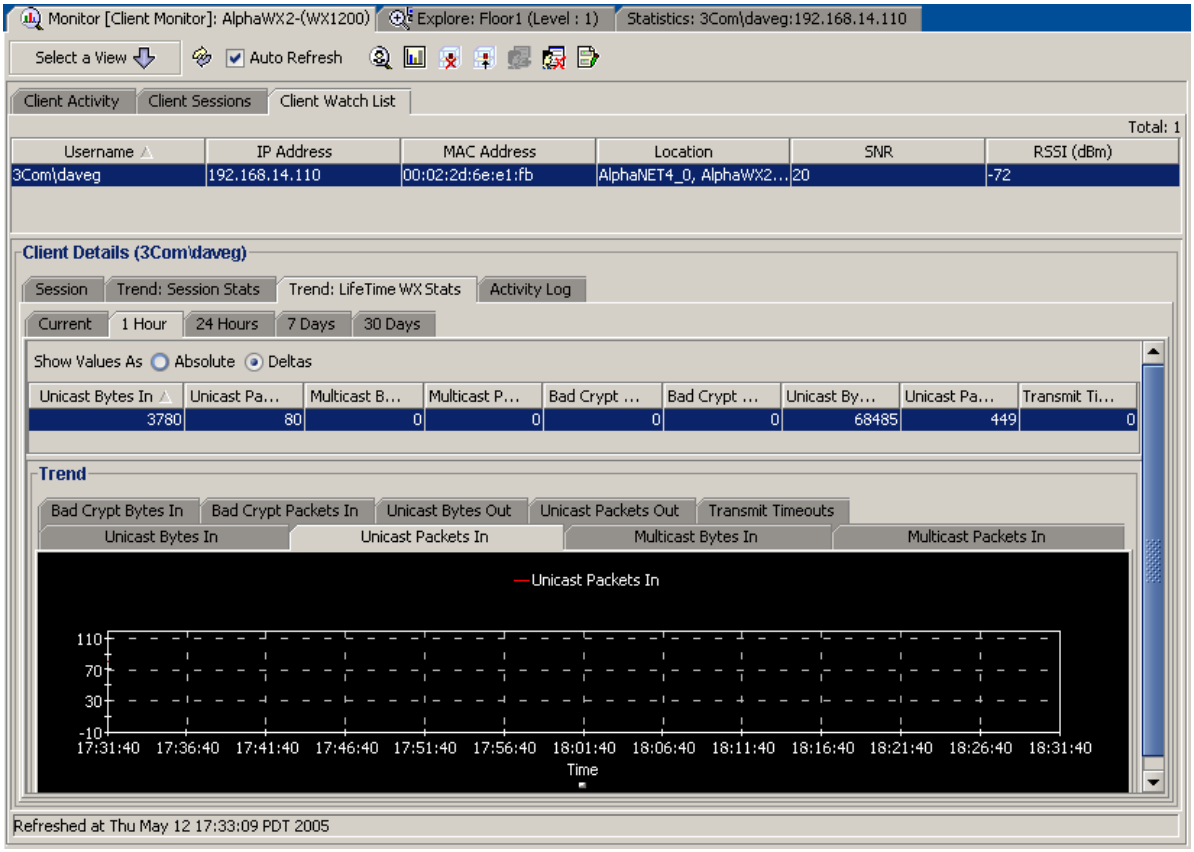

3 Select the **Trend: Session Stats** tab to display Operational Rate, SNR, and RSSI statistics.

Signal to Noise Ratio (SNR) statistics can help you determine whether the interference is being created by too much noise on a channel. Receive Signal Strength (RSSI) statistics can indicate whether a low signal strength is creating the user's performance problem. Operational rate statistics display the throughput per second. The following throughput rates are optimum:

- 802.11b–11 Mb/s (optimum)
- 802.11g/a–36 Mb/s or higher

4 Select the **Session Statistics** tab to view statistics for the current MAP, or for all the MAPs to which the user has connected to the WLAN while on the watch list.

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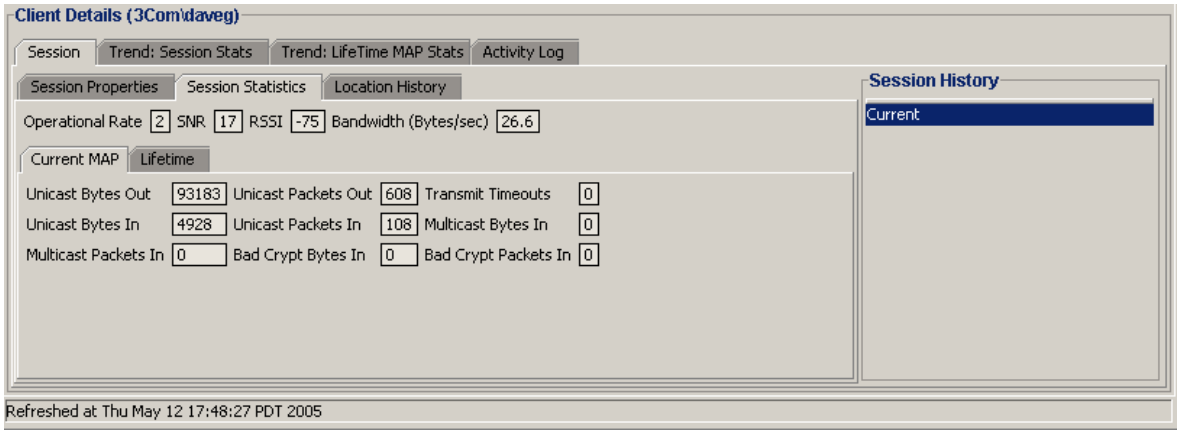
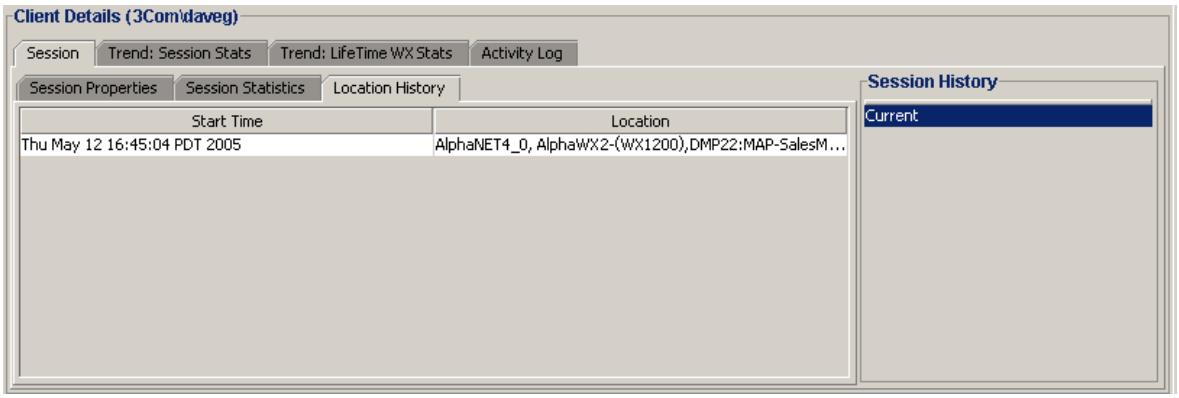

Client Details (3Com\daveg)
Session
Trend: Session Stats
Trend: LifeTime MAP Stats
Activity Log
Session Properties
Session Statistics
Location History
Session History
Current
Operational Rate 2 SNR 17 RSSI -75 Bandwidth (Bytes/sec) 26.6
Current MAP
Lifetime
Unicast Bytes Out 93183 Unicast Packets Out 608 Transmit Timeouts 0
Unicast Bytes In 4928 Unicast Packets In 108 Multicast Bytes In 0
Multicast Packets In 0 Bad Crypt Bytes In 0 Bad Crypt Packets In 0
Refreshed at Thu May 12 17:48:27 PDT 2005

A high number of Transmit Timeouts for either the Current MAP or Lifetime of the user can indicate interference problems.

5 Select the **Location History** tab to view where the user has been roaming.



These statistics indicate whether interference problems are occurring in specific areas of the WLAN.

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Monitor a Group of Users

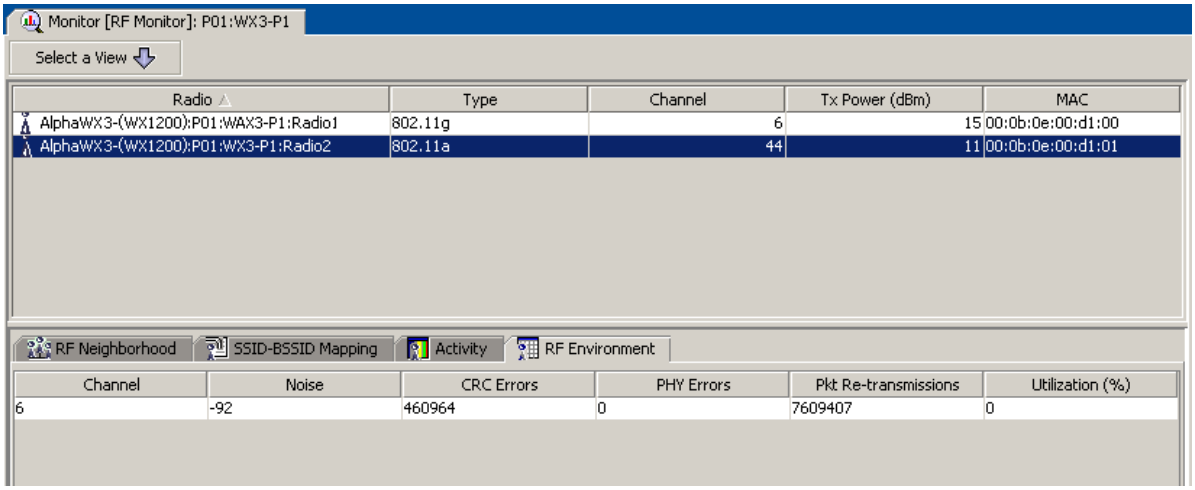
If a group of users in a specific area of a floor notify you that they are experiencing poor performance, target a radio or multiple radios, and view the noise and events. RF statistics are found under the **RF Monitor** and **RF Trends** tabs.

To view the RF monitor statistics:

1. Expand the WX switch icon in the Equipment section of the Organizer panel, then expand **Ports/MAPs**. Expand a MAP, and select a radio. Go to **Monitor > New Monitor** and select **RF Monitor** from the **Select a View** drop-down list on the Monitor tab.
2. Select the **RF Environment** tab. Statistics are displayed.

   High values for Noise can indicate a problem.

   Also, view the Utilization statistics. If utilization is very high, this could prevent new users from gaining access to the WLAN.



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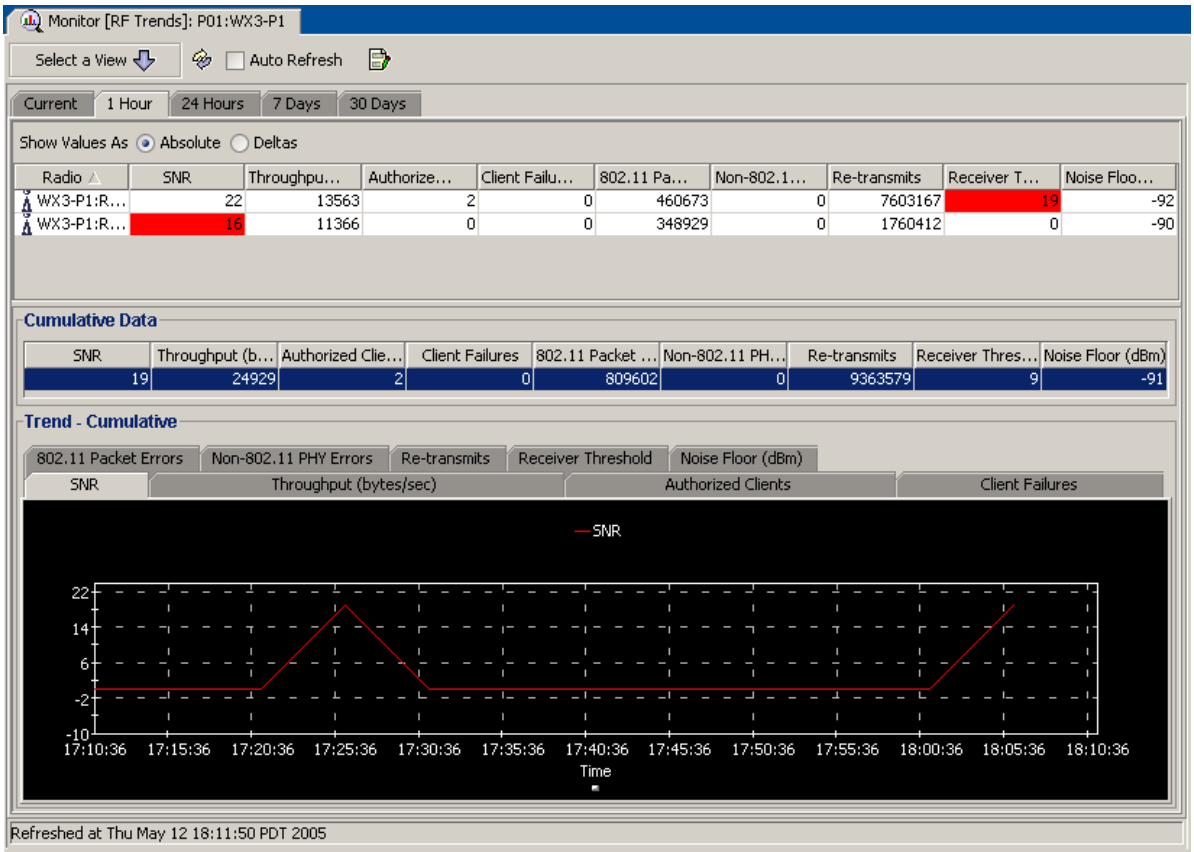
To view trends:

1 Expand the WX switch icon in the Equipment section of the Organizer panel, then expand **Ports/MAPs**. Expand a MAP, and select a radio. Go to **Monitor > New Monitor** and select **RF Trends** from the **Select a View** drop-down list on the Monitor tab.

You can view trends for a WX switch or a MAP, too.

2 View the Client Failures count.

A high count can indicate a problem with the radio.



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Monitor a Rogue

MAP radios automatically scan the RF spectrum for other devices transmitting in the same spectrum. The RF scans discover other radios, some of which may not be in the network plan. MSS considers the non-planned radios to be potential rogues, and places them on a rogue list.

A rogue access point is an access point that is not authorized to operate in your network. Rogue access points and their clients undermine the security of an enterprise network by potentially allowing unchallenged access to the network by any wireless user or client in the physical vicinity. Rogue access points and users can also interfere with the operation of your enterprise network. You can configure 3WXM to automatically use countermeasures against rogue APs to disable them.

Not all access points placed on the rogue list are "hostile" rogues. You may want to move some of the access points from the rogue list to a known devices list or a third-party AP list. For more information about this topic as well as more detailed information about combatting rogues, see the chapter "Detecting and Combatting Rogue Devices" in the *Wireless LAN Switch Manager Reference Manual.*

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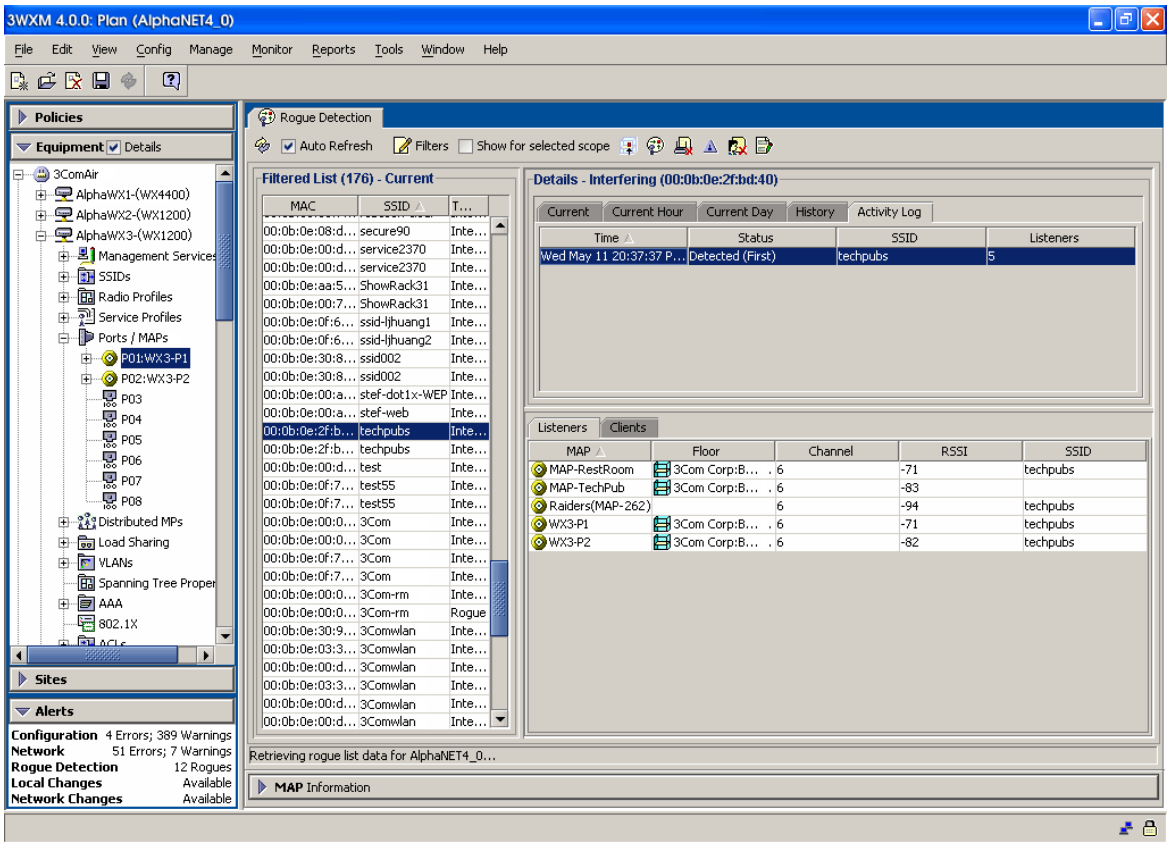
To locate a rogue:

1 From the Alerts panel, click on **Rogue Detection**. The **Rogue Detection** tab is displayed, containing the current rogue list.



2 View statistics on a single rogue. Select a rogue from the Rogue List. Select the **Activity Log** tab.

The number of listeners (other MAPs) that detected the rogue are displayed. The larger the number of listeners detecting the rogue, the easier it is for 3WXM to locate the rogue in the RF coverage area.

Under Status, the first detected event and the first "not detected" event are displayed.

3 Locate the device in the RF coverage area. Select a rogue from the Rogue List, and click **Locate**.

4 Locate the device in the RF coverage area. Select a rogue; click on the Rogue Detection window's toolbar.

The location of the rogue is displayed in the RF coverage area.

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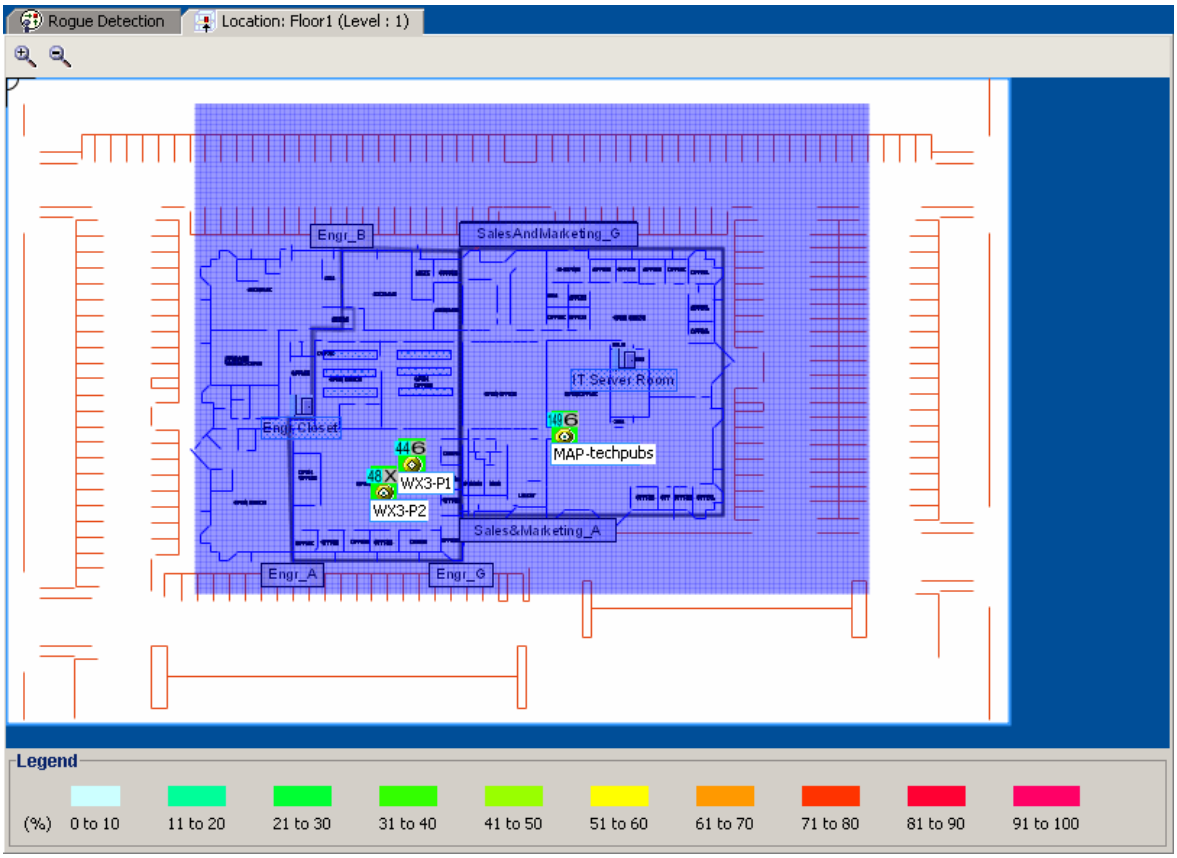

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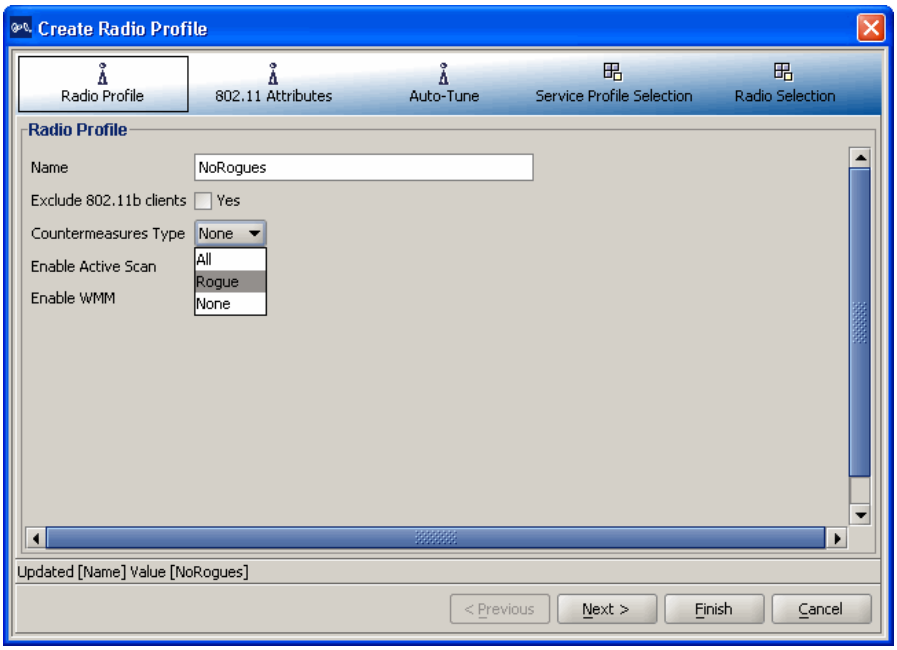
Configuring Countermeasures

You can enable MSS to use countermeasures against rogues. Countermeasures consist of packets that interfere with a client's ability to use the rogue. Countermeasures are disabled by default. When you enable them, all devices of interest that are not in the known devices list become viable targets for countermeasures.

Countermeasures are enabled on an individual radio profile basis. When you create a radio profile, you can apply it to specified service profiles or to individual radios. The following example shows how to enable countermeasures in a radio profile, then apply the radio profile to MAP radios.

To enable countermeasures:

1. In the Equipment section of the Organizer panel, right-click the icon for a WX switch, and select **Edit** from the menu.
2. Select Wireless at the top of the wizard, if not already selected.
3. Select Radio Profile from the organizer list on the left side of the page.
4. Select **New Radio Profile**. The Create Radio Profile wizard appears.



5. In the Name box, type the name of the radio profile (1 to 16 characters, with no spaces or tabs).

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6 To enable countermeasures against rogues detected by radios managed by this profile, select one of the following from the Countermeasures Type pull-down list:

- None—Radios do not use countermeasures. This is the default.
- All—Radios use countermeasures against devices classified by MSS as rogues and against devices classified by MSS as interfering devices.

  A rogue is a device that is in the 3Com network but does not belong there. An interfering device is not part of the 3Com network but also is not a rogue. MSS classifies a device as an interfering device if no client connected to the device has been detected communicating with any network entity listed in the forwarding database (FDB) of any WX switch in the Mobility Domain. Although the interfering device is not connected to your network, the device might be causing RF interference with MAP radios.
- Rogue—Radios use countermeasures against devices classified by MSS as rogues, but do not use countermeasures against devices classified by MSS as interfering devices.

CAUTION: *Countermeasures affect wireless service on a radio. When a MAP radio is sending countermeasures, the radio is disabled for use by network traffic, until the radio finishes sending the countermeasures.*

7 To disable active scanning for rogue devices, deselect Enable Active Scan.

When active scan is enabled, radios send *probe any* requests (probe requests with a null SSID name), to solicit probe responses from other access points. Radios also passively scan by listening for beacons and probe responses. When active scan is disabled, radios perform passive scanning only.

8 Click **Radio Selection** at the top of the Create Radio Profile wizard. The Radio Selection page appears.

9 Select the MAP radios on which you want to enable countermeasures from the Available Members column.

10 Click **Move** to move the radios to the Current Members column.

11 Click **Finish** to save the changes and close the wizard.

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To verify that countermeasures are being taken against the rogue:

1. Select a rogue from the Rogue List in the **Rogue Detection** tab. Click the **Activity Log** tab.
2. The **Status** column will show countermeasure activity.

   If countermeasures start, stop, and start again, the rogue may have left the area, then returned, or another MAP in the coverage area may have taken over countermeasure activities from the last MAP to detect the rogue.

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8 Optimizing a Network Plan

Overview

Optimizing your network is a post-deployment technique. You can optimize your WLAN by importing RF measurement data to correct RF attenuation obstacle information in your network plan. You optimize your network plan because:

- You have a reported coverage problem in your network
- You want to verify your network RF coverage

The RF measurement data you use to optimize your network plan can originate from:

- MAPs in your network. You can leverage the RF measurements derived from your MAPs. If you choose to use RF measurement data from the MAPs in your network, the data is determined against a smaller set of RF measurements.
- An Ekahau Site Survey™ tool. You perform a site survey of your network. The benefit of using RF measurements derived from a site survey is that the results more closely match the coverage environment that your wireless users experience in your network. Thousands of measurements can be recorded, creating a set of RF measurements that are more precise than those gained from your deployed MAPs.
- Both MAPs and a site survey.

By importing data and applying it to your network plan, you correct the RF model to reflect what the measurements report. You update the RF attenuation for obstacles based on real-world measurements. You can then replan your network to:

- Make changes in the software to improve signal strength and coverage for groups or individuals
- Modify MAP locations
- Add additional equipment to your network

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The following sections describe how to import RF measurements from your network, or how to import RF measurements from an Ekahau site survey.

Using RF Measurements from MAPs

You can apply the RF measurements derived from the MAPs in your WLAN (which regularly monitors the RF environment) to your network plan. The RF measurements are taken from MAP radios.

After you apply the RF measurements, the floor's RF model (obstacles) will be optimized with this data.

To import RF measurements:

1. Access the Building wizard, if not already open.
2. Click **Optimize RF Coverage** at the top of the wizard. The Optimize RF Coverage page appears.
3. Click **Import Measurements**. The Import RF Measurements wizard appears.
4. Select **Network** as the source of the measurements.

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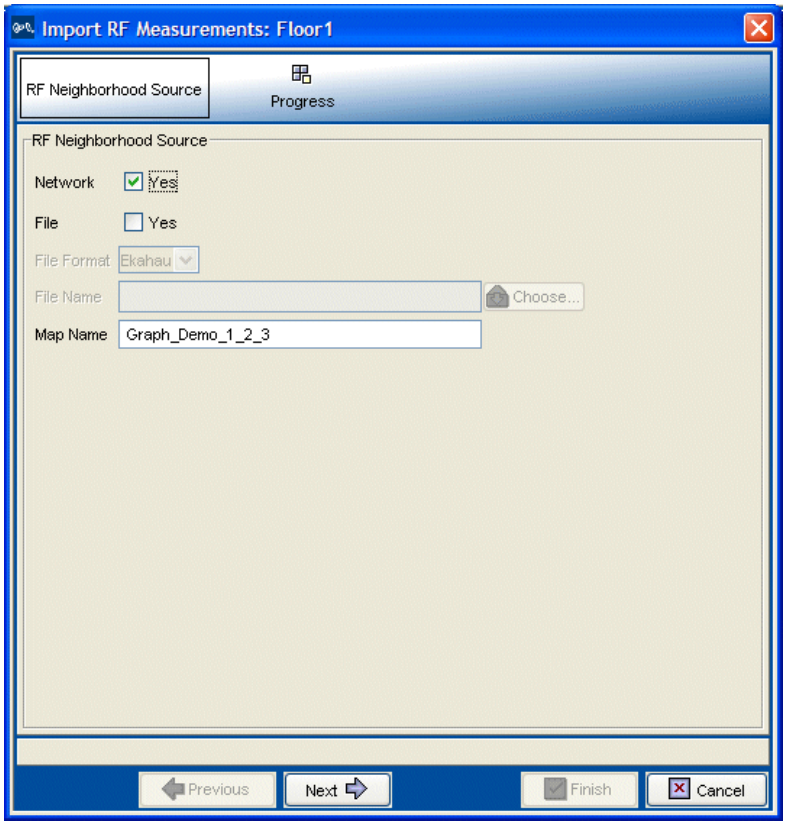

5 Click **Next**.

The import progress is displayed. When the import is done, check the *Total valid RF measurements found* line in the progress messages.

- If the number is greater than 0, 3WXM successfully imported measurements.
- If the number is 0, no measurements were imported. Try the import again. If you are using a site survey file, verify that the map name is correct.

After you apply the network RF measurements, you correct the attenuation factors for the floor. Go to "Optimizing the RF Coverage Model" on page 179 for information about this topic.

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Using RF Measurements from an Ekahau Site Survey

RF measurements come from a site survey file generated by the Ekahau Site Survey tool. To perform a site survey:

- In 3WXM—View your RF coverage area.
- In 3WXM—Generate a site survey work order, specifying the area you want to survey. A Joint Photographic Experts Group (JPEG) (.jpeg, .jpg) file is generated.
- Import the generated JPEG file into the Ekahau Site Survey tool.
- Set the scale of the drawing.
- Perform the site survey. Walk through the area, taking measurements with the tool.
- Save the RF measurements in the Ekahau Site Survey tool to a file in comma-separated values (csv) format.
- In 3WXM—Import the csv file containing the RF measurements into 3WXM.
- In 3WXM—Optimize to correct attenuation factors.

The chapter guides you through the tasks you need to do in 3WXM. For information about tasks you need to do in the Ekahau Site Survey tool, please refer to the ESS tool's documentation.

The site survey example in this chapter is based on the RF coverage area that follows. For information about displaying RF coverage areas, see "Displaying the RF Coverage Area" on page 181

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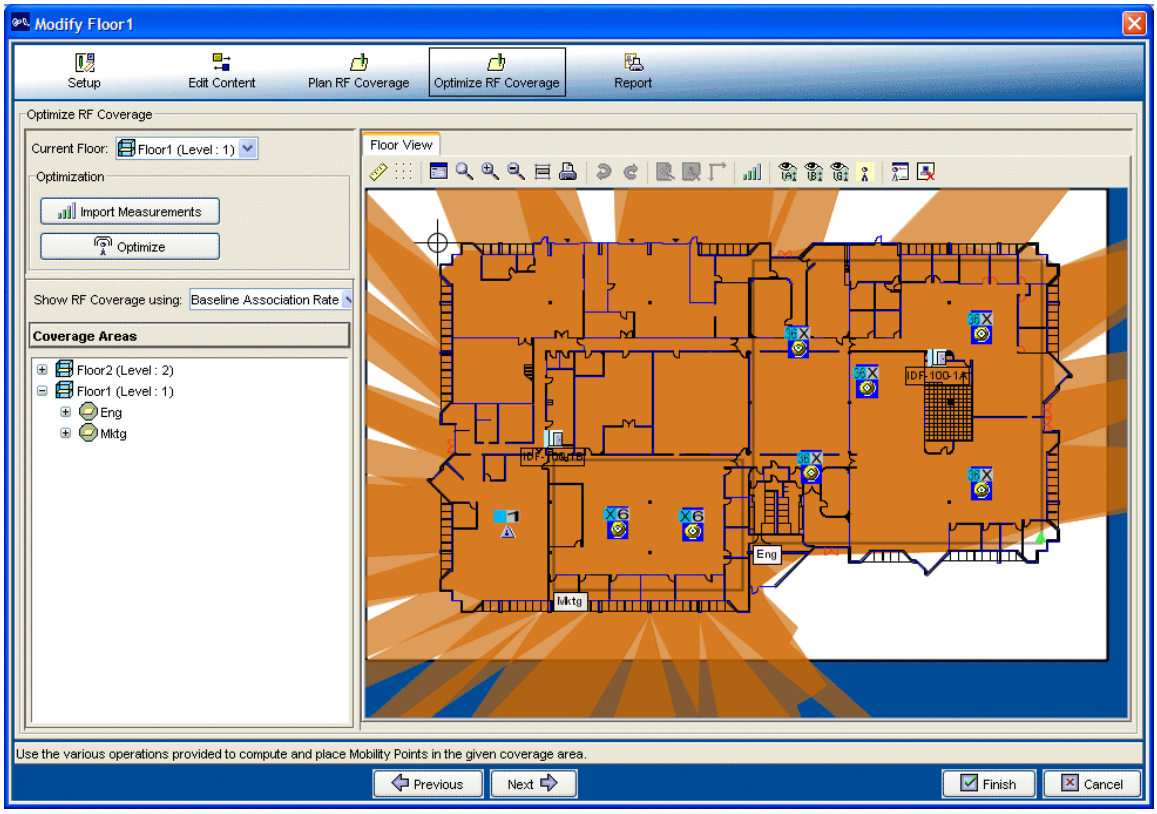

Generating an Ekahau Site Survey Work Order

The site survey order contains the locations and MAC addresses of the MAPs for use when conducting a site survey, and also provides a JPEG image of the floor.

To generate a site survey order:

1 Select **Reports** > **Site Survey Order** from the toolbar in the main 3WXM window.

The Site Survey Order Generation dialog box appears.

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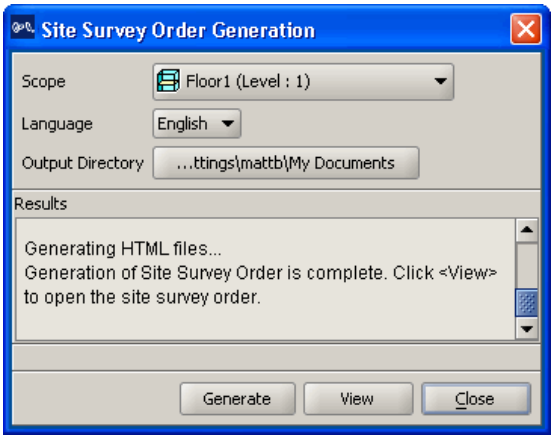

2 Select the scope for the work order.

   You can select the network plan, a site, a building, or an individual floor.

3 Select the language: English or German

4 To change the output directory for the report, click on the button next to output directory, navigate to the new directory, and click **Select**.

5 Click **Generate**.

6 When the report is generated, click **View**.

   A browser window containing the report opens.

7 Click **View Site Survey Order** to view the site survey work order.

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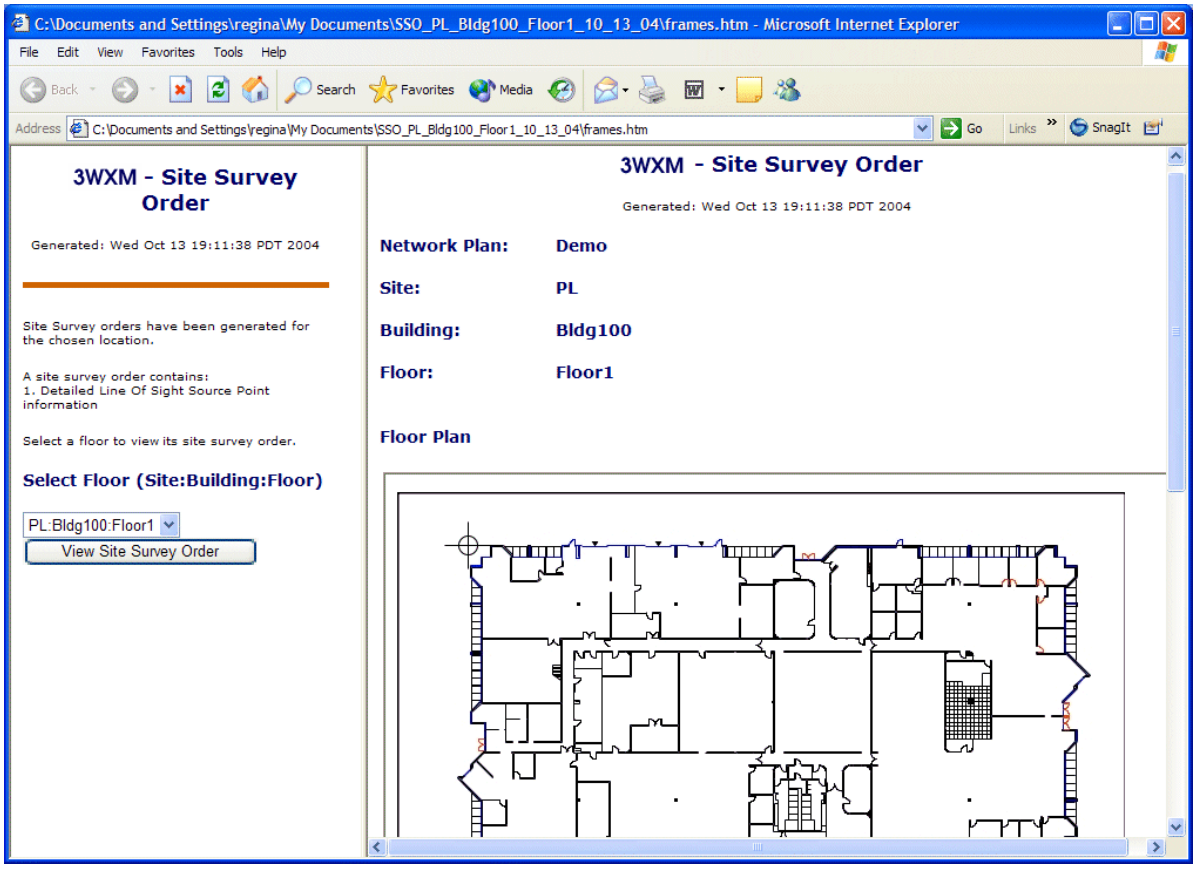
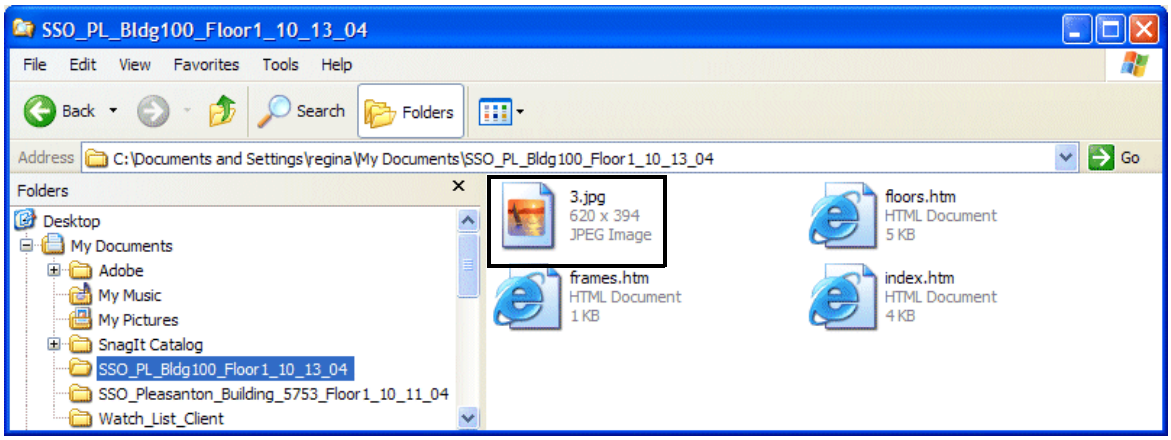

C:\Documents and Settings\regina\My Documents\SSO_PL_Bldg100_Floor1_10_13_04\frames.htm - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address C:\Documents and Settings\regina\My Documents\SSO_PL_Bldg100_Floor1_10_13_04\frames.htm
Go Links SnagIt
3WXM - Site Survey Order
Generated: Wed Oct 13 19:11:38 PDT 2004
Site Survey orders have been generated for the chosen location.
A site survey order contains:
1. Detailed Line Of Sight Source Point information
Select a floor to view its site survey order.
Select Floor (Site:Building:Floor)
PL:Bldg100:Floor1
View Site Survey Order
3WXM - Site Survey Order
Generated: Wed Oct 13 19:11:38 PDT 2004
Network Plan: Demo
Site: PL
Building: Bldg100
Floor: Floor1
Floor Plan

8 Browse to the output directory and locate the JPEG file. Copy this file and import it into your Ekahau Site Survey tool. Proceed with your site survey.



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Importing RF Measurements from the Ekahau Site Survey

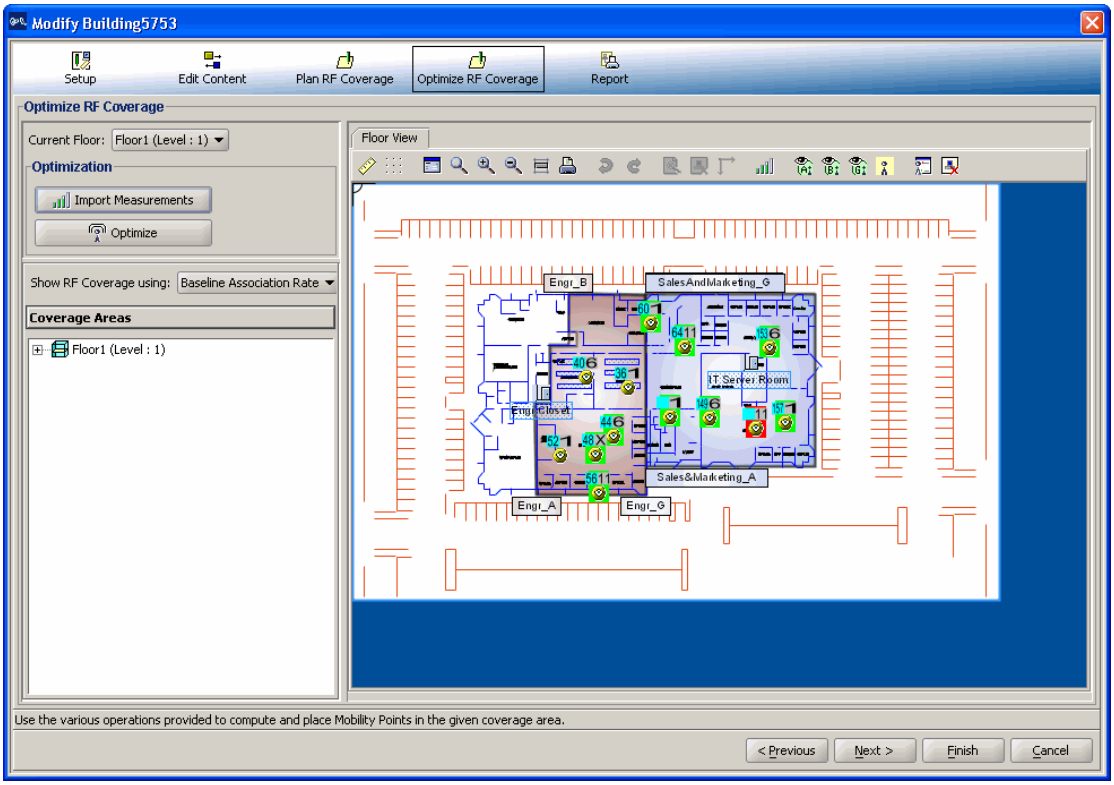
After you complete the site survey, you import the csv file containing the RF measurements from the Ekahau Site Survey tool into your network plan. After you import your RF measurements, you optimize to correct attenuation for obstacles on the floor.

To import RF measurements:

1. Access the Building wizard. Expand the Sites section of the Organizer panel to the building or floor you want to view. Right-click on the building or floor and select Edit.

   The Modify Building wizard is displayed.

2. Click **Optimize RF Coverage** at the top of the wizard. The Optimize RF Coverage page appears.



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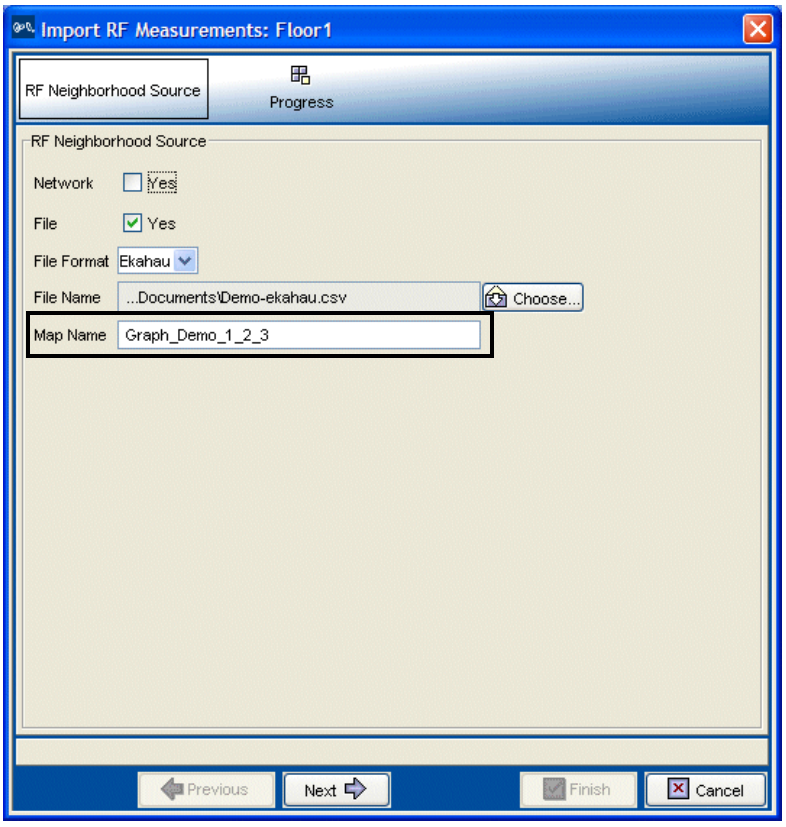
3 Click **Import Measurements**.

The Import RF Measurements wizard appears.

4 Select **File** as the source of the measurements (or, you can select both **Network** and **File**).

5 Select the file format from the **File Format** listbox.

6 Click **Choose** to navigate to the csv file that contains the RF measurement data.



7 In the Map Name field, verify the map name.

8 The map name in the RF Neighborhood Source window must match the map name in the top line of the .csv file from the Ekahau Site Survey tool.

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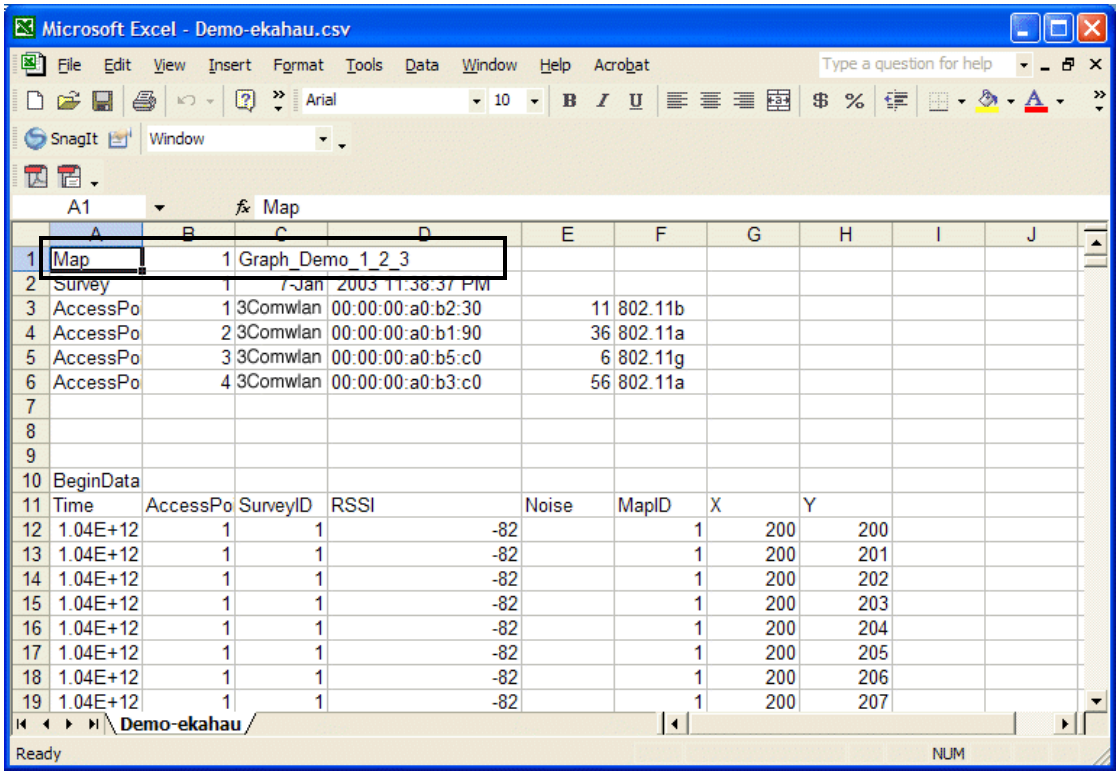

	A	B	C	D	E	F	G	H	I	J
1	Map	1	Graph_Demo_1_2_3							
2	Survey	1	7-Jan	2003 11:38:37 PM						
3	AccessPo	1	3Comwlan	00:00:00:a0:b2:30	11	802.11b				
4	AccessPo	2	3Comwlan	00:00:00:a0:b1:90	36	802.11a				
5	AccessPo	3	3Comwlan	00:00:00:a0:b5:c0	6	802.11g				
6	AccessPo	4	3Comwlan	00:00:00:a0:b3:c0	56	802.11a				
7										
8										
9										
10	BeginData									
11	Time	AccessPo	SurveyID	RSSI	Noise	MapID	X	Y		
12	1.04E+12	1	1	-82		1	200	200		
13	1.04E+12	1	1	-82		1	200	201		
14	1.04E+12	1	1	-82		1	200	202		
15	1.04E+12	1	1	-82		1	200	203		
16	1.04E+12	1	1	-82		1	200	204		
17	1.04E+12	1	1	-82		1	200	205		
18	1.04E+12	1	1	-82		1	200	206		
19	1.04E+12	1	1	-82		1	200	207		

9 Click **Next**.

The import progress is displayed. When the import is done, check the *Total valid RF measurements found* line in the progress messages.

- If the number is greater than 0, 3WXM successfully imported measurements.
- If the number is 0, no measurements were imported. Try the import again. If you are using a site survey file, verify that the map name is correct.

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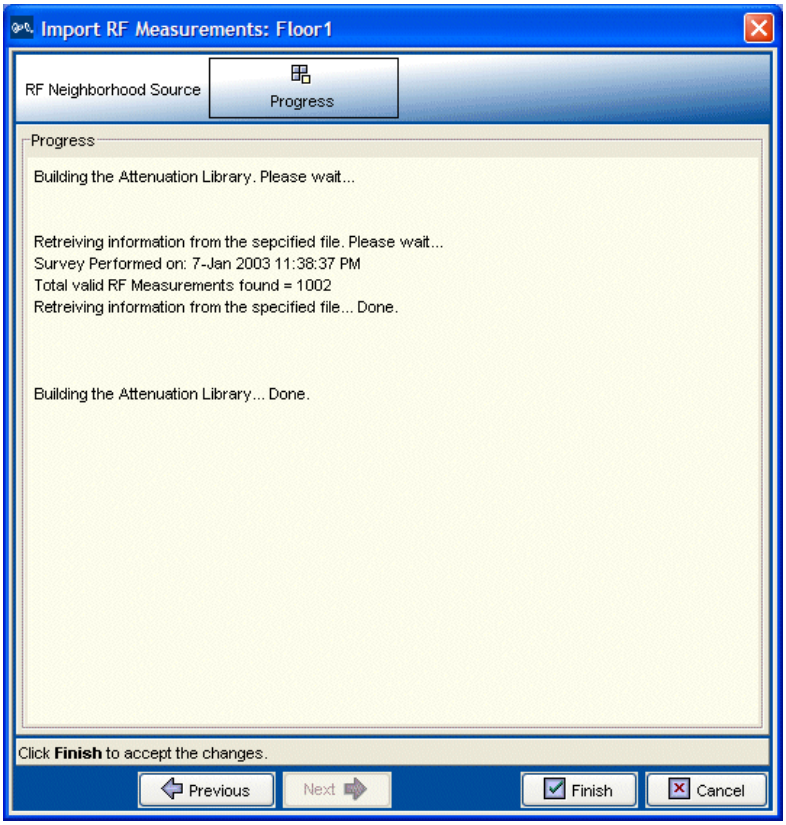

After you import your RF measurements, you correct the attenuation factors for the floor. Go to "Optimizing the RF Coverage Model" next for information about this topic.

Optimizing the RF Coverage Model

An attenuation library is a set of attenuation values for the RF obstacles on a floor. After you import RF measurements from a site survey or apply them from the RF measurements in your network to your network plan, you rebuild a floor's attenuation library using those RF measurements.

1 Access the Building wizard. Expand the Sites section of the Organizer panel to the building or floor you want to view. Right-click on the building or floor and select **Edit**.

The Modify Building wizard is displayed.

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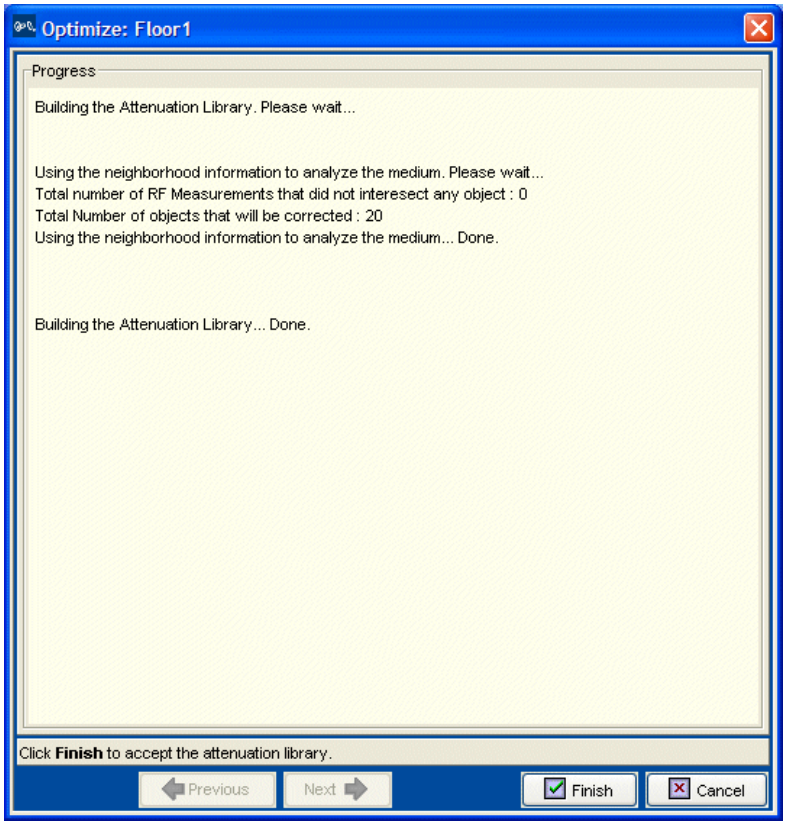
2 On the Optimize RF Coverage page of the Modify Building wizard, click **Optimize**.

A wizard appears, listing the progress of the request.


Optimize: Floor1
Progress
Building the Attenuation Library. Please wait...
Using the neighborhood information to analyze the medium. Please wait...
Total number of RF Measurements that did not interesect any object : 0
Total Number of objects that will be corrected : 20
Using the neighborhood information to analyze the medium... Done.
Building the Attenuation Library... Done.
Click Finish to accept the attenuation library.
Previous
Next
Finish
Cancel

- The *Total number of RF measurements that did not intersect any object* line lists the number of measurements that did not experience attenuation due to an RF obstacle in the path between them.

  If the measurements came from a site survey file, they are measurements between the deployed MAPs and the Ekahau Site Survey tool performing the survey. If the measurements came from MAP radios in the network, they are measurements between MAP radios.

- The *Total number of objects that will be corrected* line indicates the number of measurements that did experience attenuation. For existing RF objects, 3WXM corrects the attenuation to match the results. If the floor plan does not have an RF obstacle where the attenuation library indicates one exists, 3WXM creates an RF obstacle.

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For RF obstacles created by 3WXM, the description is **auto-generated** and the obstacle type is **Other**. You can edit these values by selecting the obstacle, clicking the Edit properties icon to open the Modify RF Obstacle wizard, and modifying the values. Click **Finish** to close the wizard and save the changes.

3 Click **Finish**.

You have optimized your RF coverage model with the new RF obstacle information. Now you can locate and fix coverage holes, or if necessary, replan your network.

Locating and Fixing Coverage Holes

After you import RF measurements and rebuild the attenuation library, you can look for coverage holes by displaying coverage. To locate coverage holes:

- Display the optimized RF coverage area to view the results of the corrected attenuation data
- Lock down deployed MAPs in the coverage area (so that 3WXM will not move MAPs in your network plan during the compute and place process)
- Compute and place
- Replan your network based on compute and place results

Displaying the RF Coverage Area

Display the RF coverage area to view the RF coverage based on the corrected attenuation data.

To display the RF coverage area:

1 Access the Building wizard. Expand the Sites section of the Organizer panel to the building or floor you want to view. Right-click on the building or floor and select **Edit**.

The Modify Building wizard is displayed.

2 Click on Optimize RF Coverage at the top of the wizard.

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3 In the Show RF coverage using listbox, select how you want to display the coverage:

- Baseline Association Rate—Coverage is shown based on the MAP radio baseline association rate. The baseline association rate is the typical data rate the radio is expected to support for client associations. (The baseline association rate is specified during planning, on a coverage area basis.)
- Data Rate—Coverage is shown in colored bands that represent each of the data transmit rates supported by the radio. These rates are standard for each radio type.
- RSSI—Coverage is shown based on the received signal strength indication (RSSI) of the radio's signal heard by other radios.

4 In the Coverage Areas section, select the scope for which you want to display coverage. You can display coverage for an individual radio, a specific coverage area, or all coverage areas on the floor.

- To select multiple contiguous objects, click **Shift** while selecting.
- To select multiple noncontiguous objects, click **Ctrl** while selecting.

5 On the toolbar, click the radio type (A, B, or G) for which you want to display coverage.

This example shows 802.11g coverage for the Mktg RF coverage area.

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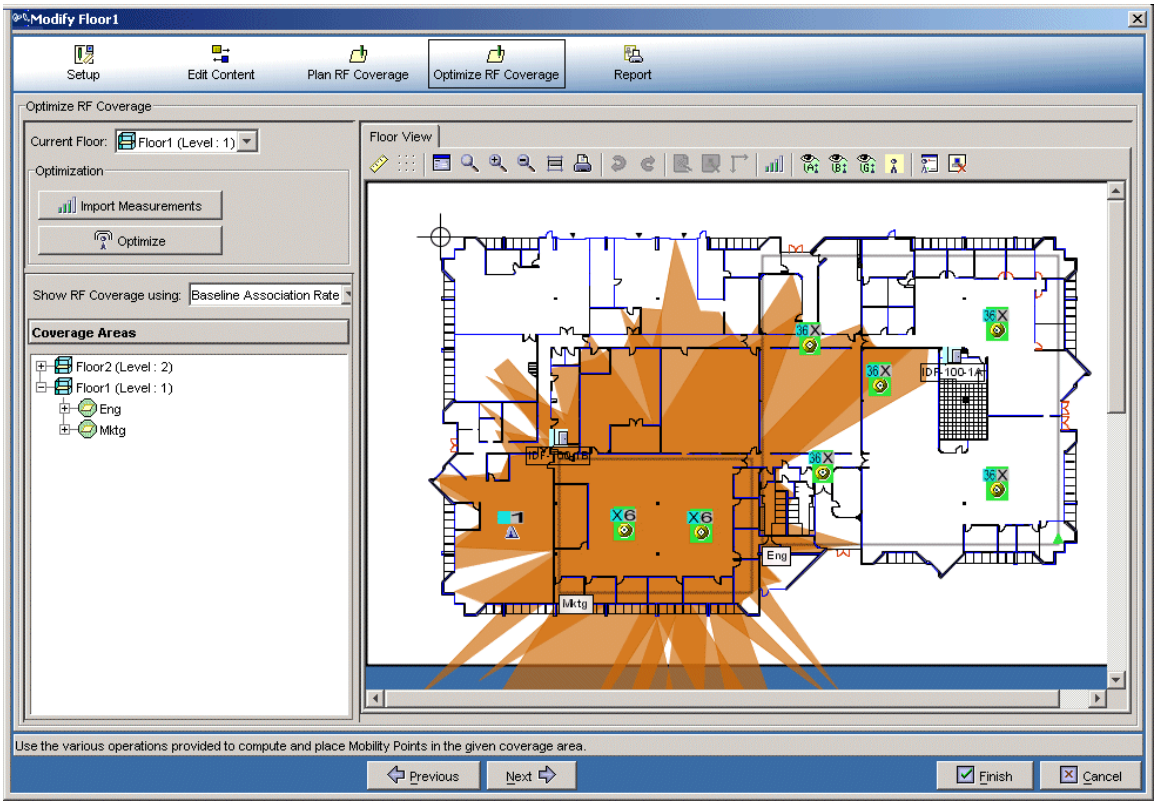

Locking Down MAPs

To prevent 3WXM from moving a MAP on your network plan that you do not want to be redistributed, lock the MAP down.

To lock down a MAP:

1. Display the RF coverage area.

   If you need information about how to display the RF coverage area, see "Displaying the RF Coverage Area" on page 181.

2. Right-click on a MAP in the RF coverage area, and select **Lock**.

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Fixing a Coverage Hole

After you import RF measurements, rebuild the attenuation library, and display coverage, you can observe any wireless coverage holes in the network. To fix a coverage hole, use any of the following methods:

- Use the Compute and Place MAPs option in the Plan RF coverage page of the Building wizard to recompute the number of MAPs needed and their recommended placement. If this option results in new MAPs being added, install the new MAPs.
- Install new MAPs and add them to the network plan. Using this method, you install the new MAP first, then integrate it into your network plan.

Computing and Placing New MAPs

The procedure for computing and placing new MAPs is the same as the procedure you use for initial planning. (See "Compute and Place MAPs" on page 134.) Using this procedure, you can determine the number and location of additional MAPs you should add to your network.

Replanning Your Network

After you have computed and placed new MAPs in the network plan, you will need to add the MAPs to your network. For information about adding MAPs to your network, see the *Wireless LAN Switch and Controller Installation and Basic Configuration Guide*. This guide contains instructions and specifications for installing an MAP access point and connecting it to a WX switch.

After you install a new MAP in the network without using Compute and Place, you will need to add it to the network plan. Do the following:

1. Use the Managed Devices tab to upload the configuration of the WX with the new MAP into 3WXM.
2. In the Organizer panel, right-click on the floor and select **Edit**. The Floor wizard appears.
3. Click **Plan RF Coverage** at the top of the wizard. The Plan RF Coverage page appears.
4. In the Coverage Areas section, right-click on the coverage area for which the MAP is providing coverage, and select **Edit Properties**.

   The Modify Coverage Area wizard appears.
5. Click **Area Associations** at the top of the wizard.
6. Click **Choose Available** next to the Access Point List group box, and select the MAP.
7. Click **Finish** to save the changes and close the wizard.

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8 Click on the **Objects to Place** tab.

9 Click on the MAP icon, then click on the location where you installed the MAP. The MAP icon moves from the **Objects To Place** tab to its location on the floor.

What's Next?

You can create a backup copy of your updated network plan, and distribute the updated 3WXM configuration to the WX switches.

For information about administrative tasks, see "Perform Basic Administrative Tasks" on page 146.

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